

# Tongue Diseases In Al-Qanun Book of Ibn-Sina

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## Summary

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The tongue is conceded a fundamental organ that share in chewing, swallowing & speech, & it can be exposed to different diseases that differs in its cause & symptoms.

& **Ibn-sina** has explained in his book (Alqanonn) about the tongue anatomy, musculature, nerve innervations, & its disease with its two division the sensory & the motor, he also explained about the local diseases of the tongue & about the tongue disease when it's a sine for a systemic disease. & he specified more than fourteen chapter about the tongue.

As he has talked in these chapters about taste disturbance, tumors, & tongue tie, what we term ankyloglossia. He also detailed for us about disturbance of speech, & also about the painful tongue disorders & he explained that its due to neurological causes, as he also indicated clearly for the bad effect of mouth breathing.

**Ibn-sina** studies about the tongue diseases shows to us the extreme awareness & accuracy, & also the logical sequence for the etiological factors, & its clear management. As the modern medicine until now agrees completely in most of what Ibn-sina have wrote.

**Key Words:** Tongue Diseases, Ibn Sina, History of Medicine

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### *Introduction:*

The old arabic medical books are not devoided from chapters specified for studying the tongue diseases; for example, in the third chapter of (Alhawi) book for **ar-Razi**, we find a section about the taste sensation & another section about the pharynx, tongue, & soft palate diseases; as he explains very briefly in the 49<sup>th</sup> chapter in his book (The Division & Subdivision of The Tongue Diseases) about nine disorders which are; tumors, fissures, roughness, ulcers, spasm, heaviness, ranula of the tongue, ankyloglossia, & macroglossia); but **Abullhassan Altabari** the author of (**The Hipocratic Treatments**), as he specified ten sections concerned about the tongue diseases such as (gagging reflexes of the tongue, ranula of the tongue, tongue convulsion, speech disturbances, & disturbances of tongue taste, & so on our inherited medical books never devoided from chapters talking about the tongue diseases & its treatments.

**Alqanunn** book of **Ibn-Sina** has been considered one of the most famous medical edditions, as it seems clear, complete, & good presentation, also its gives a clear view about the medical sciences during his century. & we also find in the second section about four-

teen chapters specialized in the tongue diseases, in addition to some other phrases related to the anatomy researches in the first chapter of the book.

& here we are going to talk about **Ibn-Sina** have wrote about the tongue in his book (Al-Qanunn) in medicine, as we are going to study the chapters concerned about the tongue as Ibn-Sina organized:-

### **Anatomy of the Tongue Muscles:**

As he mentions comprises four pairs of muscles forming eight muscles & one single muscle which is the upper tongue muscle that is described very precisely by him. So as he mentions the tongue has nine muscles, although what is known that the tongue consist in addition to the upper tongue muscle, eight another pairs from muscles instead of four, so the total number of muscles are seventeen muscles.

### **Neuroanatomy of the Tongue:**

As he talked about the trigeminal nerve which is the fifth cranial nerve, & he term it the third pair from the seven pairs, & he also describes this nerve branches very precisely similar to the modern anat-

my description, telling the branch that innervates the tongue sensation to transmit the taste sensation & this is what we term today the lingual nerve which is one of the branches of the mandibular nerve the third branch of the trigeminal nerve.

### **Anatomy of the Oral Cavity & the tongue:**

Here Ibn-Sina talks about the functions of the tongue as he says: {the tongue is an organ from the oral cavity which plays major part in the mechanism of chewing the food bolus, phonation, pronouncing letters, & differentiation of tastes. & its ventral surface is with continues attachment with the esophagus & the stomach. While the dorsum if the tongue is divided into two parts by the V-shaped (sulcus terminalis), & there is a considerable sharing between them by the communicating tendons. The tongue has a large network of subdividing nerve branches from four protruding nerves. It also consist of large network of blood supply & nerve innervations. & Under the tongue there are two orifices of the submandibular salivary glands ducts, that opens & releases its secretions into the oral cavity to keep the tongue & the oral mucosa moist & wet.

& so on as he mentions the continuity of the mucus membrane of the ventral surface of the tongue & the floor of the mouth with the mucus membrane of the gastrointestinal tract. He also observed the presence of profused blood supply & heavy innervations of the tongue. He also mentioned about the presence of the orifices of the salivary gland ducts that secretes saliva from the salivary gland, beside this he enumerated the functions of the tongue & saliva.

### **Disorders of the Tongue:**

As Ibn-Sina here describes the tongue diseases & he classifies it & he says: (the tongue can be affected by diseases that can restrict its mobility, or its sensibility & taste, & perhaps inactivates one of its senses more than the other. The tongue diseases can be a combined diseases, local, or due to the communication of the brain, & there then the cheeks & the lips can in connection in most of the times, or perhaps the all senses can take part in he tongue diseases if they where from the same nerve division that innervates the tongue. & It might pain if the stomach & sometimes the lungs & chest where involved.

Here as we can see his subdivision of the tongue diseases in motor & sensory, & one of the senses can be affected more than the others, & the tongue can pain due to systemic condition or local injury, as the disease could be in relation to the stomach, or any other organ such as the lungs & the chest. & as its known many systemic diseases has clinical features on the tongue. The tongue pain due to local injury, & he said: the tongue diseases can be detected by inspecting any changes in the texture, color, & taste sensation or the dominance of one sense either sweat or sour compared to the other.

He also differentiated between the neurological injury of the tongue that is specific to the tongue due to the affection of the lingual nerve, & between the injury to the tongue but not related to the tongue nerve branches innervations, that at which the all senses can be affected with the injury.

### **Treatment of the Tongue:**

Here he indicates that the treatment of the tongue should be general if the tongue diseases was in association with the head or stomach, i. e, if the cause was a systemic diseases. Or the treatment can be local by using gargles of the mouth, mouth rinses & rubbing materials, & the tablet that is held in the mouth, which should be flat in shape to increase the surface contact area between the medication & the oral tissues.

& so on the treatment follow the cause of the disease of the tongue, so if the tongue diseases was a syptom of a systemic disease, so we have to treat the cause, & if it was a local disease of the tongue we treat it by local medications of the tongue.

He also insures in this chapter, to be carefull in using the tongue medications so he says: {we should be aware when using the tongue & mouth medications if is was able to damage the soft palate & the lings, so it wont be ingested or reach to them,

& this sentence remind us with the warnnings written on the oral drugs pamphletes, which should not be ingested or swallowed, as it is indicated clearly for external use only.

### **Disturbance of the Taste:**

Ibn-Sina say: {the diseases can affect the taste in three aspects, & this could either be due to systemic

or local cause, & concerning the treatment it depends on the cause, so if it was due to systemic diseases that cause swelling of the tongue so the treatment will be with the emetic drugs

& so on each case it treated according to the cause.

### **Tongue Relaxation, Heaviness, & Disturbance of Speech:**

Ibn-Sina mentioned about this disease: {it could be due to a cause in the brain or due to a cause in the motor innervation or its ascending branches to the tongue, as we know what have been in association with the brain & what is not, as we find that in the other organs deriving its sensory or motor supply from the brain. & The tongue relaxation can reach its maximum until its not able to coordinate to speak or it might change.

He also mentioned that if the tongue disease was neurological it could be either central or peripheral, he also described the differential diagnosis between the two situation, & how the sense & motion is going to be in the rest of the organs.

Until today the physicians are depending on examining the specific function for each cranial nerves to determine the site of injury precisely depending for that on the differential diagnosis between the similar injuries that has similarities in its clinical features.

But for the treatments he referred it to the chapters concerned about the head diseases, on what is resulting from it. He mentioned also about using the mouth gargles & rinses, & He describes a combined preparation that to be kept under the tongue & its called Gwarshen preparation.

### **Tongue Spasm/Convulsion:**

Ibn-Sina indicates about this, in which it happens sometimes during sever fever as he says: {the tongue convulsion can be due to viscous mucous secretion that can expand the tongue muscle horizontally, or could be within sever diseases}

& concerning the treatment: {treating the tongue convulsion dose not differ from treating the generalized convulsion in the first chapter of Alqanunn

book, & what is specified about its treatment is the use packing for the neck, & warm water gargles, & also the use of rubbing mixes or mingles wither it was hot or melted sweat.

### **Tongue Enlargment (Macroglossia)**

As he mentions its causes & features by saying: {it could be due to heavy soft, simulative, mucous secretion, & the tongue might enlarge enough to extrude out of the mouth, in which the mouth can not hold it, & this condition have been describes in the chapter of tumors.

& what he had mentioned about the heavy mucous secretion, this happens due to swelling in the floor of the mouth when it gets inflamed, so the tongue will protrude out because of this. & what he had mentioned about the tumors its all known, as what occurs to the other parts of the body.

Concerning the treatments, he talked about the local medications that can be scrubbed through the tongue such as ammonia, salt, serum, & vinegar.

### **Tongue Tie/Shortness/(Ankyloglossia):**

In this chapter he talks about the tongue tie that occurs due to anatomical causes related to the lingual frenum, or due to convulsion of the tongue that would prevent its normal movement, as he says: {the tip & sides of the tongue can get attached to the lingual frenum, so this will not allow the tongue extension, or it could be due to tongue convulsion

& concerning the treatment, Ibn-Sina talked about the short frenum only, because what is related the tongue convulsion had been discussed previously.

But the treatment for the short frenum, he said it can be treated by incising the frenum from its both sides slightly, & the incision extension of the frenum can be determined as he says: {the extension of our incision depend on how much we need to relieve the tongue to move freely to touch the palate & protrude out of the mouth}.

& we still depend on the ability of the tongue to touch roof of the palate during opening the mouth as a sign to indicates the need for the surgical treatment or not

&he specifies a special way to perform it, & he says: {f you could not excise it with the stainless steel blade, to avoid any profused bleeding, so you can introduce your needle with a sharp thread under the frenum, that will penetrate the frenum with out cutting it, so the organ will not stick ant more}. and so on, he defines precisely what we know the tongue tie, & he mentioned its surgical treatment, & its done according to what is needed, & he detemined exactly the amount of that.

### **Tumors of the Tongue:**

Ibn-Sina says: {he tongue can get affected by different tumors such as, infammatory tumores, mucous tumores, solid & malignant tumores, & the sign for all theses indicatesnfor tumores.

He diffrentiated between the flabby, inflammatory & the solid tumores & this is an important indication to diffrentiate between these tumores, as the solid tumores could not be infected or it could be intact tumores or malignant or other, & we still use palpitation to inspect & differentiate primarily between the cases.

& what he says about the treatment: (if it supurates use acostics drugs in the oral cavity such as simak cook, thunja bitter drink

& If the tumore is flabby & viscouse or infammatory tumore that is reaching to its last stage, we can stick to it the burned the root of aniseed

### **Disturbance of Speech (dyphasis):**

Here Ibn-Sina details in clear discription, & we will mention the causes that Ibn-Sina gave & the sequence he dependent on him self, because it shows the clear presentation from the medical & the logical aspects, & theses causes are classified into:-

- Central nervous system causes: he says; [the aphasia & other speech disorders can be due to, disorder in he brain, & from the exit if the ascending nerve to motor innervate the tongue}
- Peripheral nervous system causes: he says: {the cause of the disorder could be in the same nerve branch}
- Anatomical & phathological causes related to the tongue: he continue enumerating the causes of

dysphsis, as he says: {it could be within the muscle either due to convulsion, expansion, stiffness, &relaxation, or tongue tie, or surgical complication that ended up with scaring or solid tumor.

- Accidental causes on the surface of the tongue that impair speech due to its resulting pain :he says: {the tongue disorder can be due to tumors or ulcers that can affect the tongue & its different aspects}
- General systemic causes: he says: {it can appear after cerebral accident, when the embolus ascends from the brain to block the tongue supply, or in sever fever cases due to dehydration so the tongue will get shrunk & convulsed which occurs seldom.
- Causes related to the larynx without the tongue: he ends enumerating the causes of dysphsis by mentioning that the causes could not be related to the tongue, but due an injury to the larynx, so he says: {the speech disturbance can be because of the muscles of the larynx in which they can be either extended or relaxed, so the person will not be able to phonate easily unless he struggles to move his chest & larynx muscles so hardly that wont be tolerated by theses, muscles, so if he get stocked in the first world then he continues, so theses people should not inhale deeply & move the chest, but he should fasten as possible, because if he got used to that, the speech will be so easy for him, & concerning the treatment it has been mentioned in other chapters}

We see in this paragraph his clear explanation about the misuse of voice, by mentioning the main causes of sever laryngitis & especially with geriatrics

### **Ranula of the Tongue:**

Ibn-Sina says about the ranula: {the ranula is a semi solid gland situated uber the tongue similar in color with surface of the tongue & its vein in which the ranula is located, & the ranula is caused by heavy viscous mucous secretion}

& we still use the term (Ranula: Dim of Frog) to describe this condition, & Ibn-Sina mentioned its cause is due to (heavy viscous mucous secretion), & also this word will express as Ibn-Sina said, mucous

extravasation due to obstruction of one of the salivary glands ducts, that will cause this pathological condition under the tongue

### **Painfull Tongue (glossodynia):**

Ibn-Sina says: {it could be due to tongue ulcers, brain fever but not reaching the meninges or the intake of spicy, salted, sour, & sweets, or polydypsia, or due to other greater causes such as sever fever & internal tumors}

It seems to us in this chapter that Ibn-Sina had focused on the adverse effect of mouth breathing that can cause dryness of the mouth that can affect the mucous membrane & the oral tissue cells, as well as the taste sensation.

So due to his notice to this adverse effect in this chapter that made him to mention first of all about the treatment of painful tongue, in which he patient is not allowed to continue opening his mouth during sleeping & lying down because when sleeping in this position can increase the possibility for opening the mouth & mouth breathing, so on that Ibn-Sina says: {the treatment for this condition, is by asking the patient to sleep on his back & close his mouth.

So as we see here the clear sign to know the consequence of mouth breathing that can cause the painful tongue, because the mouth breathing can lead to dryness of the mucous membrane of the mouth, & h also talked about the related changes to the tongue, as it can affect the taste sensation.

The preventive dentistry recent researches indicates about the nose breathing always, because the nose is the correct passage for breathing, otherwise the mouth can get affected with many diseases & infections, & especially if it was exposed cold or dry air, or even contaminated with dust.

### **Treatment of Fissured Tongue:**

He mentioned the treatment could be with catton seeds, micromelus, partialy boild eggs, & scrubing with pices from cucumber & cordiamyxa

### **Gagging Reflex of the Tongue:**

Ibn-Sina says about the gagging reflexes: {it

could be due to its large tumore or in cases of diph-teroids so the tongue will extrude outside to open the respiratory airway.

He also indicated that it could be due to tumores of the tongue or due to diphtheroids infections, which are infectios in the floor of the mouth & the larynx that causes obsructive odema in the soft palate & the pharynx that would prevent respiration, due to con-triction in the airway tract.

### **Aphthous Stomatitis:**

Here he takes about the ulcers of the tongue & mouth, & the causes can be general from inflamtion of the stomach & the head or due to fevers.

As he mentions many medication used in the treat-ment of the ulcers such as as the first line of treatment cooling & drying with (myrobalan emblic, thunja bitter drinks, rose seeds, astragalus, & armenian mud, & from the hot medications that are needed at the end (nutmeg), cyperus, saffron, anchusa officinalis, clove, peppermint, & green dates, & he ends this chapter by saying: {the majority of the physician said that noth-ing is more effective in treating the oral ulcers like painting the tongue with warm indian spikenard}.

### **Oral Thrush & Malignant Ulcerative Stomatitis:**

They are ulcers located on the furface of the mouth & the tongue

& he mentioned that it could be due to indiges-tion, he also mentioned for its treatment many med-ications such as thunja bitter drink & unripe sour grapes juice, as well as a combined ointment.

### **Pharmaceutics Preparations That Were Used by Ibn-Sina to Treat the Tongue:**

He mentioned many pharmaceutics preparaciones for treating the tongue so he prescribed to use oint-ments, mixes, mouth rinses, garggles, drinks, cover-ing the tongue with packs, tongue rubbers, the tablest that are kept under the tongue, creams, & gwarshins, beside other different types preparations that has been mentioned during his talk about treating every diseases after describing its causes & its diagnosis.

### ***Conclusion & Results:***

As we have seen from Ibn-Sina previous study about the tongue diseases that how he was encyclopedic & well aware of this topic without any prologation or wordiness, & this is from the factors that made Alqanunn Book the first academic book in medicine during many centuries.

He described the diagnosis & the treatment for many of the pathological conditions related to the tongue, such as the ranula, & tongue tie, with its differential diagnosis for the cases with similar clinical features. As he talked about the goal that we should reach when sur-

gically treating & relieving the tongue tie, & the extension of the incision for the lingual frenum.

He also indicated the different causative factors for speech disturbance in logical sequence seems to be a very specific scientific classification similar to what we use nowadays, he also talked about change in taste sensation & its different causes, he also indicated for the side effect of mouth breathing.

He also warned about the cross reaction of drugs used for treatment, as he warned from reaching of local oral medications to the digestive system, which can lead to damaging to these organs if it reaches to it.