



# Chinese Herbs for Pharyngitis Including COVID-19-Related Sore Throat

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## Abstract

Sore throat is one of the most prominent clinical manifestations seen among mild cases of coronavirus disease 2019 (COVID-19). Traditional Chinese medicine (TCM) modalities, especially Chinese herbs, have accumulated rich experience in successfully treating sore throats in both acute and chronic pharyngitis. By sharing a real-world case study of three patients suffering pharyngeal discomfort including sore throat that might be related to the new coronavirus infection and have similar manifestations to general viral-induced pharyngitis, the article systematically presents and summarizes key Chinese herbs for acute and chronic pharyngitis based on TCM herbal prescriptions (principles of herbal formula writing) below: clearing heat and removing toxins, nourishing yin and the throat, loosening the stools and soothing the throat, along with TCM syndrome differentiation or disease differentiation and treatment. Moreover, a modern interpretation of these principles in terms of the relationship between Shanghuo and Fire Rising, which may often be characterized by local redness, swelling, fever, and pain in the mouth or throat along with possible inflammation, and the correspondence between the pharynx and the anus are proposed. Finally, the article will share their experience in applying specific herbs locally via various pharyngeal delivery modalities to improve efficacy including recommended prescriptions for a variety of acute and chronic pharyngitis, as well as those that may be caused by the new coronavirus infection.

## Keywords

- ▶ COVID-19
- ▶ pharyngitis
- ▶ sore throat
- ▶ Chinese herbs
- ▶ omicron variant
- ▶ TCM

## Introduction

Sore throat, as a common viral-induced throat symptom (including those that may be caused by the new coronavirus infection), is one of the most prominent clinical manifestations among mild coronavirus disease 2019 (COVID-19) cases, especially during the current prevalence of the omicron variant. Although symptoms of the sore throat do subside over time, its acute distress or possible sequelae of long-lasting throat discomfort often require timely intervention. For acute and chronic pharyngitis, conventional medicine has no viable solution except antibiotics and painkillers.

In contrast, traditional Chinese medicine (TCM), with thousands of years of history, has accumulated a rich clinical experience, in ample amounts of successful cases, treated with either natural ways of Chinese herbs or acupuncture. Herewith, the article will review and analyze the herbs commonly used in TCM for the treatment of acute and chronic pharyngitis and the principles of their formulations (herbal formula writing) and then provide a modern interpretation of these formulating principles along with their own clinical expertise, including recommended herbal prescriptions for sore throats due to acute and chronic pharyngitis or those that may be COVID-19 related.

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## Sore Throat Being a Prominent Symptom for Mild Coronavirus Disease 2019 Cases

Since December 2019, COVID-19 has certainly turned our world upside down with more than millions of positive cases and claimed over six million lives. Studies have shown that upper respiratory tract symptoms including acute pharyngitis are common symptoms of COVID-19, with a reported incidence of 5 to 17.4% prior to the omicron variant. Since January 2022, when the omicron variant started prevailing, sore throat became one of the more prominent symptoms reported, particularly with breakthrough infections in those who have been fully vaccinated and boosted. It is observed that those fully vaccinated are not yet contracting serious symptoms such as high fevers for days and difficulty in breathing; instead, they are normally experiencing gentler or milder symptoms.<sup>1,2</sup>

In April 2022, a large-scale study from the United Kingdom revealed that fully vaccinated populations infected with COVID-19 during omicron prevalence (with at least two doses of any severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2] vaccine) had significantly different symptoms, duration following infection, and hospitalization rates compared with those infected during delta variant prevalence, consistent with the current judgment that symptoms of omicron variant are generally less severe.<sup>3</sup> The study compared the self-reported symptoms of 4,990 patients each who were infected during either omicron or delta prevalence between June 2021 and January 2022, and it was found that the most frequent symptoms in those infected during omicron prevalence were runny nose (76.5%), headache (74.4%), sore throat (70.5%), sneezing (63.0%), a persistent cough (49.8%), and hoarseness (42.6%). It also found that loss of smell was less common, 16.7 and 52.7%, respectively. Sore throat was more common in participants infected during omicron prevalence than during delta prevalence, 70.5 and 60.8%, respectively ( $p < 0.01$ ). There was a lower rate of hospital admission during the prevalence of the omicron variant than during the delta variant, 1.9 and 2.6%, respectively ( $p = 0.03$ ).

It is known that SARS-CoV-2 can attack the body in a range of ways, causing damage to the nervous system, lungs, heart, kidneys, liver, and other vital organs. However, the reason why pharyngitis or sore throat is often considered as an early and common symptom is because SARS-CoV-2 always seems to attack the throat region first. A recent study consisting of 36 healthy volunteers inoculated with SARS-CoV-2 found that viral load rises rapidly in the infected, with viral loads at the throat and nose sharply peaked at 112 and 148 hours, respectively.<sup>3</sup> Though the viral load in the nose is much higher than in the throat, the virus is detected first in the throat. During the 2 to 4 days following infection, the volunteers' symptoms became apparent, but most were mild respiratory symptoms such as sore throat, runny nose, and sneezing, and seven of the volunteers developed fever (above 37.8°C), but none developed a persistent cough. In this study, these volunteers, aged 18–29 years, were considered healthy and without evidence of previous infec-

tion or vaccination. They were inoculated with a wild-type coronavirus found in the United Kingdom in early 2020 and were not the most recent prevalent variant of the new coronavirus infection.

It is known that the pharynx is a membrane cavity located behind the nose and mouth, connected to the larynx and esophagus, respectively. Sore throat is a common yet characteristic symptom of pharyngitis which is an inflammation of the pharynx located at the back of the throat, and other symptoms may include a scratchy sensation in the throat and difficulty in swallowing. As for the larynx, that is a hollow tubular organ that forms the airway for the lungs and vocal cords or known as the "inflamed vocal cavity" (located at the top of the neck) when inflamed. Therefore, the main symptom of laryngitis is hoarseness or loss of voice. Pharyngitis often coexists with laryngitis, which becomes laryngopharyngitis, and is often caused by a viral infection, but sometimes may also be caused by a bacterial infection. The most common symptoms of laryngopharyngitis include difficulty in swallowing; sore, swollen glands in the neck or jaw; swollen, red tonsils; white patches or pus on tonsils; and a hoarse or muffled voice, in addition to pain or a scratchy sensation in the throat.

Although acute viral pharyngitis gradually subsides in most patients after about a week, the sore throat during the first few days is the most unbearable. It not only affects daily drinking, eating, or speaking but also makes it difficult to swallow saliva. At times, thick sputum accumulated from the depth of the throat can only be expectorated after repeated violent coughs. To soothe the sore throat, conventional medicine mainly relies on analgesics, as antibiotics are only effective for bacterial infections, not for viral infections. In rare cases, pharyngitis can recur and become chronic. As always, TCM generally has a wealth of successful experience in dealing with acute or chronic pharyngitis, whether the cause may be viral, bacterial, or any other.

As ► **Fig. 1** depicts, these are the pictures of the pharynx of a case study consisting of a family of three (daughter and her parents) when they were suffering from significant sore throat, possibly due to COVID-19 in January 2022. One can easily notice that local congestions of the pharynx were present but no obvious signs of lymphoid follicles or any noticeable swelling around the tonsils.

The daughter was a 20-year-old college student and had previously received two shots of the COVID-19 vaccine (Moderna) 7 months prior to the onset of the sore throat. At the time of the onset, she had a high fever, sore throat, fatigue, and little or no coughing and was tested positive for SARS-CoV-2 via nucleic acid. She recovered completely within a week after plenty of rest and daily taking of Tylenol and a Chinese herbal tea called Ban Lan Gen Chong Ji (Isatis root beverage). Her father and mother, 72 and 68 years old, respectively, had both received a third (booster) shot of the COVID-19 vaccine (Pfizer) 1 month prior to the onset of the sore throat. They were considered to be in close contacts with their daughter living in the same household and quickly developed a sore throat 3 days after the onset of the symptoms in daughter but neither of them had fevers or coughs. The mother felt fatigued and had the most severe throat pain of



**Fig. 1** Photographs of the pharynx of three mild COVID-19 cases in a single family. Notes: (A) daughter; (B) mother; and (C) father. The use of pictures has been approved by patients.

the three, especially when eating, talking, or drinking; she sometimes could not even swallow saliva without pain. The mother was generally constipated prior to the onset and that worsened especially during the onset. The father's sore throat was the mildest of the three, but his usual cough due to drainage of sinus secretions (possibly chronic sinusitis) became more frequent during the onset. He generally had loose stools prior to the onset but did not notice any significant change during the onset. Immediately after the onset, both parents began to take several kinds of Chinese herbs as they were TCM physicians themselves. The mother took Chinese herbal formula, such as Yin Qiao Wan (lonicera and forsythia pill) and Liu Shen Wan (six spirited pill) etc., as well as acupuncture (bloodletting at auricular reflex points—heart, lung, kidneys, and Shaoshang (LU 11)). After 3 days of treatment, her sore throat was completely relieved and her usual stamina finally recovered after a full week. The father took a daily dose of Chinese herbal tea, Chinese herbal powder, and Chinese herbal granules of Yu Xing Cao (Houttuynia) approximately 15 g with water along with several pieces of Ba Zhen Guo (Lee Chin Li Dried Eight Immortals Fruit). After 2 weeks of treatment, all of his throat issues were resolved. At 1 and 3-month follow-up, all three cases indicated no sequelae symptoms to note. Again, it noted that the parents were only tested via nucleic acid one time along with their daughter 3 days prior to the onset, and the results showed that both parents were negative except the daughter. The parents did not get retested during or after the treatment or recovery phase. As close contacts of their daughter, it was the parents' assumption that their sore throats are most likely caused by the same SARS-CoV-2 virus as their daughter.

### Commonly Used Chinese Herbs and the Principles of Formulating Herbal Prescriptions for Acute and Chronic Pharyngitis

In TCM, pharyngitis generally belongs to the category of bi-syndrome in the throat, as it was first described in the

*Huangdi Neijing (Yellow Emperor's Inner Classic)*. Whereas in *The Mastery of Laryngology*, it was stated “All redness and swelling that are invisible are known as Bi-syndrome, if they are visible then they are known as moths.” From this, the ancient TCM practitioners consider tonsillitis as a nipples moth or Ru E; and plum-pit qi syndrome or Mei He qi is a kind of chronic pharyngitis, whereas the sudden loss of voice due to acute laryngitis is called Bao Yin.

Without a doubt, a long-standing and effective usage of TCM has accumulated rich clinical experience in using herbs to treat acute and chronic pharyngolaryngeal diseases, and with that comes numerous successful reports of using single and compound herbal prescriptions or proprietary herbal formulas. To put it simply, under the guidance of the general TCM treatment principles of targeting both the symptoms and the root cause, the treatment principles of Chinese herbs for acute and chronic pharyngolaryngeal diseases are as follows: during the acute stage, the priority is to first treat the symptoms, such as clearing heat and detoxification, and during the chronic stage, the priority is to first treat the possible root causes, such as nourishing or tonifying yin. For acute pharyngitis, herbs commonly used for clearing heat and detoxification may include Jin Yin Hua (Lonicera), Lian Qiao (Forsythia), Da Qing Ye (Isatis leaf), Ban Lan Gen (Isatis root), Guan Zhong (Dryopteris), Huang Qin (Scutellariae), Huang Lian (Coptidis), etc.; effective Chinese herbal formulas include Yin Qiao San (Lonicera and Forsythia powder), Liu Shen Wan (six-spirited pill), Shuang Huang Lian Ke Li (Lonicera, Scute, and Forsythia granules), Pu Ji Xiao Du Yin (universal benefit formula to eliminate toxin drink), Yin Qiao Jie Du Wan (Lonicera and Forsythia pill), Shuang Huang Lian Kou Fu Ye (Lonicera, Scute, and Forsythia oral liquid), etc., which all may have significant effects on relieving sore throat. For chronic pharyngitis, herbs commonly used to nourish or tonify yin may include Xuan Shen (Scrophularia), Mai Dong (Ophiopogon), Sheng Di Huang (raw Rehmannia), Yu Zhu (fragrant Solomon's seal), Shi Gao (Dendrobium), Bai He (lily bulb), Tian Hua Fen (trichosanthes root), Sha Shen

(glehnia), etc.; effective Chinese herbal formulas include Er Chen Wan (two aged pill), Xuan Mai Gan Jue Ke Li (Scrophularia, Ophiopogon, Licorice, and tangerine peel granules),<sup>4</sup> nourishing yin and clearing lung decoction,<sup>5</sup> Lee Chin Li Dried Eight Immortal (Baxianguo), Jin Guo drink or tablet, compound grass coral tablet, compound green olive tablet, etc. All of these herbs can alleviate many uncomfortable symptoms such as dry or scratchy sensations in the throat and stop mild coughs.

Actually, for acute and chronic pharyngitis, in addition to clearing heat and nourishing yin, Chinese herbs also help to reduce swelling, moisten the larynx to soothe the throat, and reduce hoarseness, loosen stool, etc. The corresponding commonly used Chinese herbs are Niu Bang Zi (burdock), Pang Da Hai (Boat Sterculia seed), Jie Geng (Platycodon), Du Zhong (Eucommia) to nourish the throat and remove swelling; Mu Hu Die (Oroxylum), Chan Tui (cicada), He Zi (chebula) to soothe the throat and restore voice; and Da Huang (rhubarb) to loosen stool. In a formula prescription, these are often paired with the above clear-heat and nourish-yin herbs.

In the clinical treatment of patients with pharyngitis, TCM often uses pattern diagnostics and treatment and applies specific scripture formulas from ancient doctrine as the basis of modification to formulate custom herbal prescriptions. For example, when acute pharyngitis is caused by heat fullness in the spleen and stomach, it is necessary to dispel the wind that attacks the Wei qi (defensive qi) level and clear heat to benefit the pharynx, and it is recommended to use Qing Yan Li Ge Tang (throat and chest heat-removing decoction) recorded by Hou Ke Zi Zhen Ji (*Purple Collection of Laryngology*) or use with modification if necessary. For chronic patients with pharyngitis due to the deficiency of lung and kidney yin and asthenia fire, the treatment should be based on the status of the lung and kidney, respectively. For those with a deficiency of lung yin, clearing the lung and nourishing yin should be the priority; for those with a deficiency of kidney yin, one should prioritize nourishing yin and reducing fire, moistening and soothing the throat with Bai He Gu Jin Wan (Lilium Compound Antiphlogistic Pill) recorded by Yi Fang Ji Jie (*Collection of Medical Formulas*) or use with modification if necessary. For deficiency of the spleen and stomach and loss of nourishment of the pharynx, one should replenish qi to invigorate the spleen and clear the throat with Bu Zhong Yi Qi Tang (invigorating spleen stomach and replenishing qi decoction) recorded by Pi Wei Lun (*Treatise on the Spleen and Stomach*) or use its modification if necessary. For those with phlegm obstruction and blood stasis, it is advised to dispel phlegm and remove blood stasis, remove nodules and benefit the throat with Hui Yan Zhu Yu Tang (epiglottis resolving blood-stasis decoction) recorded by Yi Lin Gai Cuo (*Correcting the Errors in the Forest of Medicine*) or use its modification if necessary.<sup>6</sup>

Why are all these “syndromes” in TCM related to the onset or persistence of pharyngitis symptoms? And why can they be treated with the corresponding herbal medicines? The following is a scientific interpretation of conventional medical knowledge on the mechanism of acute and chronic pharyngitis.

Acute pharyngitis is mostly caused by viral infections, including the new coronavirus infection, which develops when the body's resistance is low. Viral infections, like the invasion of other pathogenic microorganisms, are, in the view of TCM, a kind of Xie qi (evil qi). Among them, those highly contagious, such as the new coronavirus infection, are often considered as epidemic poisons. The body's resistance to evil qi belongs to the Zheng qi (righteous qi, including Wei qi). Only when the Zheng qi (righteous qi) is insufficient to fight off the Xie qi (evil qi), one would become sick. Therefore, for the treatment of pharyngitis, no matter if it is in the acute or chronic stage, caused by the new coronavirus infection or not, one should always focus on replenishing all the deficiencies, such as yang deficiency, yin deficiency, lung deficiency, kidney deficiency, etc., throughout the entire process.<sup>7</sup>

The relationship between pharyngitis, especially those that are chronic and intractable in nature with the functions of TCM-specific spleen, stomach, lung, and kidneys, as well as phlegm blockage and blood stasis, can be interpreted as follows: the pharynx is both the upper opening of the digestive tract and the opening of the respiratory tract, and its upper part is connected with the nasal cavity and sinuses, and its lower part is connected with the vocal organs of the larynx and trachea. Therefore, not only can the pharyngeal tissues themselves become inflamed when attacked by pathogenic microorganisms such as viruses or when the pharyngeal organs are damaged by overuse such as persistent loud talking, singing, or violent coughing, but also the discharge of phlegm from the trachea, the reflux of stomach and esophageal contents, or the down-flow of sinus secretions can also frequently irritate the pharynx and lead to chronic pharyngitis. In addition, abnormal sensations in the throat itself such as foreign object feeling or sensation may also be related to throat issues.

Therefore, Chinese herbs aimed at treating diseases of these pharyngeal-related organs are essential to the syndrome differentiation and treatment of pharyngitis: when caused by pathogenic microbial infections in the throat, it can be treated by clearing heat and removing toxins, and Ban Lan Gen (Isatis root), Lian Qiao (Forsythia), and Da Qing Ye (Isatis leaf) can be chosen; when caused by phlegm irritation in the lower respiratory tract (trachea and lungs), it can be treated by ventilating the lungs and resolving phlegm, and Pi Pa Ye (Loquat leaf), Sha Shen (Glehnia), and Zi Su (Perilla) can be chosen; when caused by reflux of stomach and esophageal contents, it can be treated by harmonizing the stomach and lowering rebellious, and qi Ban Xia (Pinellia), Hou Po (Magnolia bark), and Fo Shou (finger citro) can be chosen; when caused by the sinus drainage, it can be treated by clearing the nasal passages and dispelling the wind and relieving pain, and Xin Yi Hua (Magnolia flower and Cang Er Zi (Xanthium), Fang Feng (siler root), and Jing Jie (Schizonepeta) can be chosen; when it is caused by abnormal sensation in the throat itself such as plum-pit qi, it can be treated by nourishing blood and yin, as well as moistening the throat to voice, and Dang Gui (Angelica root), Bai Shao (white peony), He Zi (Chebulae), and Shi Chang Pu (sweetflag rhizome) can



be chosen; when it is related to external pressure on the larynx, such as hypertrophy of the thyroid gland or cervical lymphatic tuberculosis, it can be treated by dispersing nodules and soothing the throat, and Hai Zao (Seaweed), Kun Bu (Kelp), Xia Ku Cao (Prunella), and Zhe Bei Mu (Thunberg Fritillaria Bulb) can be chosen, etc.

In fact, the above-mentioned formulations of Chinese herbal prescriptions can only be considered based on disease differentiation and treatment or cause differentiation and treatment, rather than syndrome differentiation and treatment. The real meaning of syndrome differentiation and treatment is to formulate prescriptions according to the patient's physique and the individual characteristics of the disease after combining with the cause classified by "syndrome, which is a type of real individualized Chinese herbal therapies." However, for most acute and chronic pharyngitis, the usual disease differentiation and treatment can already achieve good results, especially when the pandemic was quickly spreading, and the development and promotion of proprietary Chinese formula herbs such as Liu Wei Di Huang Wan (Six-Flavor Rehmanni Pill), Niu Huang Jie Du Wan (bovine bezoar detox pill), etc. with the goal of treating generalized diseases is justifiable and rational.<sup>8</sup>

### Loosen Stools Relevant to Soothe the Throat

Since ancient times, almost all the effective Chinese herbal prescriptions for pharyngitis contain ingredients that will loosen stool, such as adding Da Huang (rhubarb) to trigger bowel movement, Huo Ma Ren (hemp seed and honey) to lubricate the intestines, or adding Xuan Shen (Scrophularia), Sha Shen (glehnia), and Mai Dong (Ophiopogon), which all help nourish yin, reduce fire heat, and move the bowels.<sup>9</sup> Why are these herbs with the effect of loosening stools used in the treatment of pharyngitis? In the view of conventional medicine, this seems to be irrelevant, but TCM bridges them for systemic consideration due to the following two reasons.

First, it is related to the perception of Shang Huo or fire rising in TCM and belongs to the treatment of reducing the fire. A sore throat is one of the most obvious symptoms of "fire" in TCM. Other symptoms are often red and swollen eyes, oral ulcers, dark urine, toothache, and dry stools or constipation. TCM believes that the imbalance of yin and yang in the human body and the exuberance of internal fire lead to the overall fire rising. Therefore, the so-called Shang Huo is to describe certain hot symptoms in the body, and the fire means also the internal heat symptoms that occur when the body's yin and yang are out of balance. Under the guidance of the principle of removing internal fire, herbal formulas that loosen stools to soothe the throat can often achieve good results in the clinic.

Second, the theoretical basis of TCM for the principle of loosening stools to soothe the throat also includes the perception that the mouth links to the anus in an up-down correspondence. According to the five-zang theory of TCM, the lung collects the po or corporeal soul. Ancient TCM doctors regarded various innate sensory functions including hearing, vision, and sensations of the skin such as hot, cold,

pain, itch as po, and called the anus the gate (door) of the corporeal soul, meaning that is where the corporeal soul may leak. Therefore, in ancient times, when rescuing a dying patient, the first thing to do was to find something like a cork-like object to plug the anus first, to prevent the leakage of po. The Huang Di Nei Jing (*Yellow Emperor's Inner Classic*) stated: "corporeal soul gate is mutually regulated by the Five-Zang as water and food are not reserved for a long time." Bing Wang (the scholar from Tang dynasty who reorganized the *Huang Di Nei Jing* [*Yellow Emperor's Inner Classic*] in the present eight-one chapters) had a note about that sentence "the door of the anus is also connected to the lungs, so it is called the door of Po, which has a similar pronouncing to another word Po which means - waste from a digested meal or stools in Chinese." Because the anus is the last place where the stools passes out, it is also called a "po door."<sup>10</sup>

There are also many clinical facts that prove the correspondence between the throat and anus. Clinically, certain purgative herbs such as Huang Lian Shang Qing Pian (Coptis Clear tablets) and Niu Huang Jie Du Wan (bovine bezoar betox tablet) can help alleviate sore throats. According to Chinese Medical Pharmacopeia,<sup>4</sup> Huang Lian Shang Qing Pian (Coptis Clear tablets) are mainly used for dispersing wind and clearing heat, reducing fire, and relieving pain. It is used for dizziness, toothache, sore and scratchy throat, oral ulcers, earache and tinnitus, constipation, frequent, and painful urination caused by a wind-heat attack and heat accumulation in the lung and stomach. Niu Huang Jie Du Wan (bovine bezoar detox pill) is composed of artificial Niu Huang (Calculus bovis), Xiong Huang (realgar), Shi Gao (gypsum), Da Huang (rhubarb), Huang Qin (Scutellaria), Bing Pian (Bornel), and Gan Cao (licorice), which is used for clearing heat and remove toxin, dispersing wind and swelling, dizziness sore mouth and nose, toothache from wind and fire, red eyes, sore throat, redness and swelling of the lymph nodes, etc. It should be used with caution for patients with weakness or loosen stool, and it is contraindicated for pregnant women.

When pharyngitis occurs in patients who are usually constipated, the degree of pharyngeal pain is higher than those whose stools are shapeless and loose. TCM believes that where there is stagnation, there will be a pain, and the pain will disappear once the stagnation is removed. The fact that if the bowels are open, the pharynx does not hurt can be another clinical example of it. Applying Chinese herbs to promote bowel movement, together with diuresis, sweating and expectoration are important means of reducing the new coronavirus load and its toxicity in the early stage, which is one of the four major principles of treatment for COVID-19 in TCM.<sup>7</sup> Available evidence suggests that constipation or diarrhea, like sore throat, is often a symptom of a new coronavirus infection.<sup>11</sup> This is another evidence of the TCM perception that the lung and the large intestine are interior-exteriorly related.<sup>11</sup> Therefore, for patients who suffer constipation and sore throat simultaneously, using herbs that may promote bowel movement can kill two birds with one stone, that is, treating the lung or intestines together.<sup>7</sup>

However, when applying the principle of loosening stools to soothe the throat, it is important to take control of the duration and degree of removing fire or loosening stools to soothe the throat. For example, for chronic pharyngitis, do not apply too much or for too long any heat-clearing and detoxifying herbs, especially Niu Huang Jie Du Wan (bovine bezoar detox pill), or take them on top of other laxatives. Although they may be good at loosening stool, they may hurt the functions of the spleen and stomach and yang qi during a prolonged usage, resulting in further constipation or loss of appetite because of the overwhelming bitterness and coldness of the herbs. Additionally, Niu Huang Jie Du Wan (bovine bezoar detox pill) needs to be taken with extreme caution as it contains Xiong Huang (realgar), which may impair liver and kidney function when taken for a long time.

Thus, it is advisable to select and use certain safer and gentler herbs that moisten the intestines, such as Huo Ma Ren (hemp seed) with honey to replace those with strong laxative effects. Besides, one can prepare easy and simple herbal teas to soothe a sore throat at home, for example, put a pinch of green tea leaves and some Lonicera powder or Lonicera flowers into a teapot, soak in boiling water for 10 minutes, add a bit of honey for taste, and then drink when fully dissolved.

### Diversified Ways of Local Herbal Administration in the Throat

It is worth pointing out that there are other ways of administering herbs in the treatment of pharyngitis besides the common way of ingestion; these include local administrations around the throat like buccal tablets, smearing, spraying, gargling, aerosol inhalation, etc.

In the process of oral consumption of Chinese herbs for pharyngitis, many people believe the efficacy of decoction is often better than that of pills. The rationale for this is not only because of the faster absorption of decoction but also because of the local contact with the throat during the ingestion of the decoction. In fact, when acute sore throat occurs, local administration of the throat is often the first choice, especially when patients with mild cases treat themselves at home. There are various Chinese herbal prescriptions or forms of preparation available,<sup>12</sup> including candies, lozenges, tablets, pills, such as Bo He Tang (peppermint candy), Li Gao Tang (pear candy), Luo Han Guo Pian (monk fruit tablets), Pang Da Hai (boat sterculia seed tablets), Jin Guo Yin Tablets, Yan Li Shuang Drops, Liu Shen Wan (six-spirited pill); lotions, such as Jin Guo Yin Syrup, Pi Pa Lu (loquat lotion), etc.; creams, such as Pi Pa Gao (loquat paste), Qiu Li Gao (autumn pear paste); dispersants, such as Wu Bei San (cuttlefish bone and fritillaria powder), Tan Ke Jing San (phlegm cough-out powder), aerosols (Jin's self-developed formula), etc. The best form of herbal preparation or local administration method can be selected according to the characteristics of individual pharyngitis.

With the spontaneous regression of viral pharyngitis, many patients first have a progression of inflammation in the throat from the outside to the inside or from the top to

the bottom, and then reverse to recover. When there is redness and swelling in the posterior oral cavity of the throat, the pain is the most intense. Because the throat is the entrance shared by the respiratory and digestive tracts, with a dense distribution of sensory nerves, eating or even swallowing saliva can trigger the pain. The larynx is below the pharynx, which is the inlet of the lower respiratory tract and vocal cords. There will be hoarseness in case of inflammation. Further down is the trachea. The inflammatory secretion of the airway, namely sputum, will move from bottom to top and finally be coughed up. For inflammation occurring in the pharynx, although various types of forms of herbal preparations can be applied locally, it is important to remember that the time of local contact with Chinese herbs in the pharynx and the degree of local absorption is related to the form of herbal preparation, such as liquid form should be more easily absorbed locally than solid form, and the more viscous the liquid such as syrup should have a longer contact time, etc. Of course, those forms with shorter contact time for each administration can be compensated by increasing the frequency of administration, such as lozenges.

As for the inflammation in the larynx, because of its depth of location, the herbs, whether buckled or ingested, actually do not come into contact with the inflammatory region, and their efficacy should be achieved mainly through absorption by intake into the stomach. If they have local contact with the larynx, it will only induce a cough reflex. Therefore, for laryngitis and the inflammation beneath it (trachea), it is most appropriate to apply Chinese herbal spray or aerosol inhalation. The authors have applied Jin's self-prepared formula of aerosol inhalation to treat two elderly patients with severe coughs caused by chronic pharyngitis. The following are the ingredients: Bai Bu (Stemona root) 25 g, Yu Xing Cao (Houttuynia) 50 g, Da Qing Ye (Isatis leaf) 50 g, Jin Yin Hua (Lonicera) 25 g, Jie Geng (Platycodon) 10 g, Bo He Ye (peppermint leaves) 10 g, and Lai Fu Zi (radish seed) 25 g. Combine all ingredients and decoct over a gentle fire for 5 minutes, and then pour the hot liquid into the thermos, immediately begin to inhale the steam for 5 to 10 minutes with an open mouth. Symptoms are relieved significantly in a few days. A variety of brands of nebulizers are now available in the market. Regardless of whether it is pharyngitis with or without cough or dry cough with or without phlegm all can be treated quite well with some effort in the selection and formulation of the right herbs.

For local oral administration of Chinese herbs, in addition to its direct contact with the throat, it has the added benefit that it is absorbed by the parenteral route, which can avoid the first-pass effect of the liver and the destruction and degradation in the gastrointestinal tract, which can help maintaining the efficacy and improving the bioavailability of the herbs and also reducing potential side-effects of ingredients on the gastrointestinal tract and liver. Moreover, it acts more rapidly. It has been determined that a single herbal tablet or pill generally requires 10 to 20 minutes for it to be completely absorbed from the gastrointestinal capillaries to take effect, while the same herb only takes approximately 30

to 60 seconds from its sublingual administration to take effect, that is, 10 to 20 times faster than ingesting.

Therefore, to further improve the efficacy of Chinese herbs in the treatment of acute and chronic pharyngitis, it is necessary to focus on the combination of local herbal administration onto the throat and overall syndrome (or disease) differentiation and the treatment; when selecting the local administration, one should consider the best Chinese herbal preparation and administration ways according to situations and circumstances.

## Recommended Chinese Herbal Prescriptions for Acute and Chronic Pharyngitis

Based on the authors' own clinical experience in TCM for more than 50 years, here are two custom formulas (self-named Jin's Eq. 1 and Jin's Eq. 2) recommended for various general types of acute and chronic pharyngeal disorders, respectively.

Jin's Eq. 1: Qing Ye Niu Bang Tang (Isatis leaf and burdock decoction) for acute pharyngitis: Da Qing Ye (Isatis leaf) 30 g, Niu Bang Zhi (burdock) 15 g, Shan Dou Ge (Sophora root) 15 g, Ma Bo (puffball) 10 g, Bai Zhi (Dahurian Angelica root) 10 g, Gan Cao (licorice) 10 g, Bo He (peppermint) 10 g.

Jin's Eq. 2: She Gan Xuan Shen Tang (belamcanda rhizome and Scrophularia decoction) for chronic pharyngitis: She Gan (belamcanda rhizome) 20 g, Xuan Shen (Scrophularia) 15 g, Pang Da Hai (Polygonatum) 15 g, Jie Geng (Platycodon) 10 g, Zi Wan (Aster) 10 g, Gan Cao (licorice) 5 g, and Qing Guo (Canarii Fruit) 5 g.

The functions of the selected herbs in the above two formulas are well documented in the book *Shi Yong Zhong Yao Xue (Practical Chinese Herbology)* by Yaoyu Wang.<sup>9</sup> They are from the following classical herbal formulas: Xi Jiao Da Qing Tang (rhinoceros horn and Da Qing Ye Decoction) for the treatment of sore throat; Pu Ji Xiao Du Yin (universal benefit formula to eliminate toxin decoction) for the treatment of big head plague and throat discomfort; Niu Bang Tang (burdock decoction) for the treatment of typhoid fever, sore throat, and other symptoms; She Gan Ma Huang Tang (Ephedra and belamcanda rhizome decoction) for the treatment of coughing and rebellious *qi*; Xuan Shen Jie Du Tang (Scrophularia formula to eliminate toxin decoction) for treating sore and swollen throat; Jie Geng Tang (Platycodon decoction) for treating sore throat and lung carbuncle due to Shao Yin disorder; and Zi Wan Tang (Aster decoction) for treating cough with consumptive fever.

To put it simply, the formula of Da Qing Ye (Isatis leaf), and Shan Dou Gen (Sophora root) help clear heat and detoxify; Niu Bang Zhi (burdock), Ma Bo (puffball), She Gan (belamcanda rhizome), Xuan Shen (Scrophularia) reduce swelling and pain to soothe the throat; Jie Geng (Platycodon), Zi Wan (Aster), Gancao (licorice) moisten the lung and lower lung *qi*, tonify *qi*, and eliminate phlegm in the throat; Qing Guo (Canarii fruit), Bo He (peppermint), and Pang Da Hai (boat sterculia seed) soothe the throat and facilitate voice; Bai Zhi (Dahurian angelica root), which is effective for all kinds of neuralgia, strengthens the analgesic effect. In addition, Shan

Dou Gen (Sophora root), Niu Bang Zhi (burdock), She Gan (belamcanda rhizome), Xuan Shen (Scrophularia), and Pang Da Hai (boat sterculia seed) all have mild effects of moistening the intestines to move the bowels, which is very suitable for "soothing the throat." In rural areas of Huzhou, Zhejiang, China, where one of the authors worked as a "barefoot doctor" for nearly three years (1969–1971), using the above herbal remedies to treat many patients with acute viral or bacterial pharyngitis and tonsillitis with high fever with remarkable results. At that time, due to the shortage of medicine in rural areas, the treatment was purely TCM and all herbal and most of the patients' high fever subsided quickly while the pharyngeal inflammation was resolved within 2 days after taking the herbs. This demonstrates the efficacy of such Chinese herbal formulas is indeed credible and still serves as a valuable reference for the current prevailing COVID-19.

Yaoyu Wang (1904–1979), a great master of TCM, was the inventor of the well-known Chinese herbal remedies such as Xiao Er Jin Dan Pian (Children's Jade Defense Tablet), Niu Huang Jie Du Pian (bovine bezoar detox tablet), Yin Qiao Jie Du Pian (Forsythia detox tablet), Sang Ju Gan Mao Pian (cold-treating tablet of mulberry leaf and Chrysanthemum), Huo Xiang Zheng Qi Shui (lophanthus antifebrile water) and Wu Bei San (cuttlefish bone and fritillaria powder). In 1928, he studied under Xichun Zhang, another great master of TCM, and in 1930, he was the chief editor for the magazine *Tomorrow's Medicine*, which advocated the combination of TCM and Western medicine and became famous and influential in China and abroad. *Shi Yong Zhong Yao Xue (Practical Chinese Herbology)* remains one of the best books on Chinese herbal medicine combining TCM and Western medicine.

The above describes the commonly used effective herbs for acute, chronic pharyngitis, and the principles of formulating these herbs and recommends two formulae and their modifications based on causes (diseases) differentiation and the treatment, as well as the herbal knowledge introduced by Yaoyu Wang. They are suitable for all causes of pharyngitis, whether or not caused by the new coronavirus infection. It should be noted that the formulas recommended by the authors are also derived from those well-known ancient prescriptions, with only a few modifications based on the author's own experience. Thus, there is no need to be rigid in their clinical application. To easily identify the efficacy of which herb is in an herbal formula, it is advisable to prescribe fewer types of herbs in each formula. Too many herbs in a formula prescription, which usually shows you the lack of confidence in most herbs, should be avoided.

## Summary

After the efforts of modern TCM practitioners, especially the extensive practice of global TCM for the treatment of COVID-19 in recent years, there are increasingly effective herbal remedies for respiratory tract infections including pharyngitis. Because TCM emphasizes on the syndrome differentiation and the treatment, it is difficult to compare which formula is more or less effective in their application. It is more important to keep in mind the treatment principles of

TCM for this disease and to be flexible in dispatching herbals and formulating prescriptions instead of sticking to an empirical prescription to treat all the patients with the same disease. On the one hand, one should carefully consider the duration and degree of “cooking temperature” when loosening stools to soothe the throat, to both avoid any side effects while achieving good efficacy. On the other hand, it is important to focus on diversified administration routes including local herbal administration at or near the throat.

In addition, because pharyngitis caused by the new coronavirus infection is highly contagious and aggressive in nature, the manifestations of each patient can vary widely depending on the individuals’ natural immunity. It is essential to have the cases closely monitor their conditions and to seek immediate medical attention if and once the conditions worsen. In the United States, all medical measures to prevent or treat COVID-19 shall be performed under the guidance of a Western physician.

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**Guanyuan Jin:** Conceptualization, investigation, supervision, writing -original draft. **Louis Lei Jin:** Supervision, writing-review & editing.

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#### Conflict of Interest

The authors declare no conflict of interest.

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