



Nasolabial folds and Wrinkles of Face-An Overview

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Abstract

The world population is aging and along with that facial aesthetics is also gaining importance. It is observed that up to thirty years, the chronological age corresponds with the facial age. Beyond that the facial age supersedes the chronological age. As age advances, soft tissues lose the support in certain areas and in some other areas the tissues get hypertrophied. Nasolabial fold is a classic example of hypertrophied tissue. Folds and wrinkles of the face interfere with the emotional expressions. Presence of wrinkles makes an aged individual appear more emotional. Women are more sensitive to the folds and wrinkles and they want to treat the condition with a view to improve the facial profile. Modern science provides different treatment methods which can achieve varying levels of success and sustainability. This overview has included the basic elements of fold and wrinkles that appear in the face and the treatment methods along with preventive measures.

Keywords: Nasolabial Folds; Facial Wrinkles; Dermal Fillers; Eye Tracking; Botox Injections; Facial Exercises

Introduction

Nasolabial folds are bilateral skin creases that connect ala of the nose to the angle of the mouth. This forms a distinct separation between the upper lip and the cheek. Along with advancing age, the length and depth of nasolabial folds increase. Nasolabial folds are more pronounced in men than in women. Though present in both the genders, men's folds can become deeper due to facial sagging

and a less defined jawline. Women may experience skin sagging in areas like the forehead (wrinkles) and cheeks (sagging). Age related deepening of nasolabial fold happens mainly because the skin loses collagen and thereby its elasticity [1,2].

Effect of age on nasolabial folds

With advancing age, numerous structural and functional characteristics of skin change viz. thinning, increase in fragility, limita-



Figure 1: Nasolabial folds.

tions in elasticity, dryness, appearance of wrinkles and age spots (Figure 2). These changes may cause skin bruises. This is due to the thinning of epidermis and reduction in the number of epidermal cells. Because of the epidermal changes, skin lesions take too much time to heal. Dermis which is seen below the epidermis also gets thinned because of the reduction in collagen and elastin fibres.

The layer of fat beneath the dermis (subcutaneous tissue) also undergoes reduction and because of that, the plumpness usually seen with youth gets reduced when the age advances. The changes in the face would indicate age. When the skin layers get thinned, it may end up with the formation of wrinkles (Figure 2).



Figure 2: Age spots.

Skin has the capability to produce natural oil (sebum) and sweat and this process gets reduced with advancing age; eventually making the skin dry. The protective barrier effect of skin also gets reduced. Pigmentation changes like age spots and uneven distribution of pigments are noticed very often [3].

Skin contributes to one sixth of the body weight. It serves as a bulwark between the environment and the most sensitive internal tissues. Skin has a maintenance function of body temperature, internal hydration and surveillance of the immunological function. As age advances, the skin care parameters get shifted from aesthetic concerns to function which has a direct link to the quality of life [4].

Nasolabial folds - normal phenomenon or disease

Nasolabial folds are skin creases; otherwise known as smile lines which run from the sides of the ala of nose to the corners of the mouth. These lines become pronounced when a person smiles and with the advancement of age. The prominence of nasolabial folds is related to loss of collagen, reduced elasticity of the skin and possible changes that happen with the bone structure. However, this cannot be considered as a disease. Some individuals consider the deepening of the folds as unesthetic, probably because of the indication of old age which the folds make.

Exposure to sunlight (UV Radiation) can break down collagen and elastin and can cause visible signs of aging in the skin. Nicotine and other chemicals contained in the cigarettes can create con-

siderable situations for wrinkles in the facial skin. Deficiencies of hydration, sleep and nutrition can affect the skin health. Frequent smiling and other activities of the facial musculature can cause deepening of the folds which can be considered as a professional hazard for the TV and drama artists [5,6].

Nasolabial folds are present from birth but in due course of time the prominence gets altered. Response to deepening of folds varies with individuals. If people can tolerate the changes, no aesthetic problems are raised. Individuals who have higher aesthetic concerns, demand for treatment. Men feel that the folds provide a more masculine appearance which they cherish. Women appreciate a convex contour for their facial profile without any blemishes (Figure 3,4).



Figure 3: Prominent nasolabial folds.



Figure 4: Face without folds and wrinkles.

Treatment for nasolabial folds primarily aims at obliterating the folds. A dermatologist and a cosmetic professional can help in achieving the aesthetic goal. Dermal fillers are the first choice and the results obtained should not be considered as permanent. On aging, the folds may reappear. Taking care of the skin by adopting protection from the sun, maintaining hydration (water level) of the body tissues and ensuring balanced diet can reduce the prominence of the labial folds (Figure 5,6).



Figure 5: Face with nasolabial fold.



Figure 6: Face without folds after treatment.

Facial wrinkles- measurement and treatment methods

Facial wrinkles have been identified on different regions of the face and they are named according to the location as follows: horizontal forehead lines, glabellar frown lines, periorbital lines, peri-auricular lines, cheek lines, nasolabial folds, radial upper lip lines, radial lower lip lines, corner of the mouth lines, marionette lines, labiomenal crease and horizontal neck folds. These lines are classified into six grades according to the visibility and depth of the wrinkles (Figure 7).

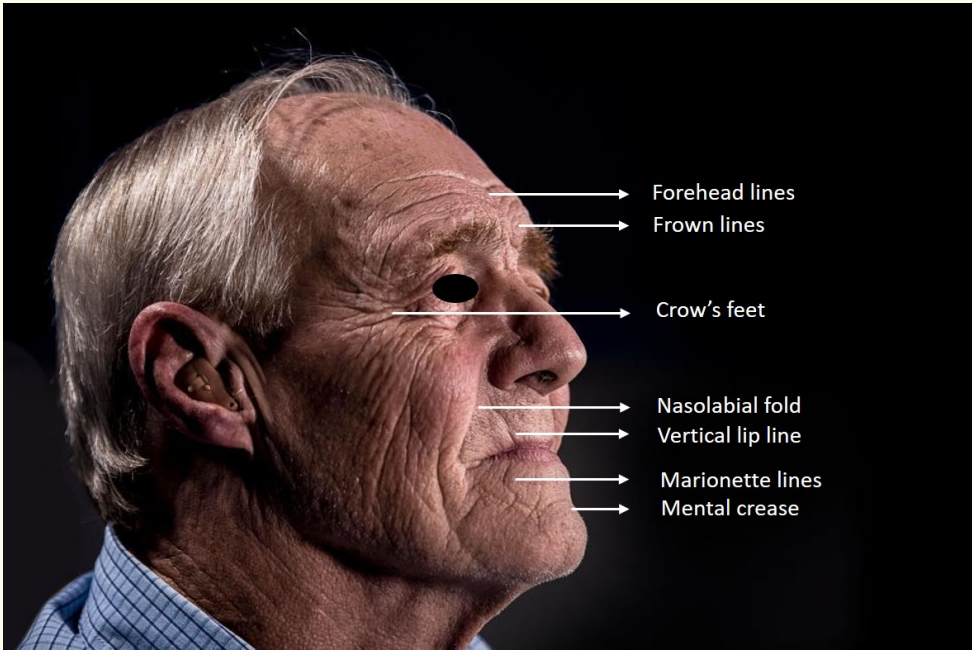


Figure 7: Wrinkles and folds of face

- No wrinkles
- Just perceptible wrinkle (0.060mm)
- Shallow wrinkles (0.290)
- Moderately deep wrinkle (0.485mm)
- Deep wrinkle with well-defined margins (0.650mm)
- Very deep wrinkle (0.940mm)

Wrinkle measurement is done using a silicone impression or on a cast prepared from the impression. Stylus profilometers are used to measure the depth of wrinkles. It applies a load of 200 mg. The stylus can record depths up to 25nm. The measurement helps to compare the pre and post treatment effects.

Treatment for the fold and wrinkles is done by injections using dermal fillers like collagen, hyaluronic acid, dextran micro spheres and polyethyl acrylate particles. Microneedling is a minimally invasive procedure which stimulates collagen production. Radio frequency energy is applied to heat the skin and which promotes production of collagen causing tightening of the skin and the folds become faint. Chemical peeling causes exfoliation of the superficial layers of skin and reduces the appearance of the lines. Wrinkles are reduced by lasers also which can improve overall skin tone. Thread lifts and face lifts are surgical options to modify the face profile and to reduce the wrinkle and folds [7].

Eye tracking experiments were conducted to determine the effect of nasolabial folds on the aesthetics of female individuals. Eye tracking technology assesses aesthetics by objectively determining the position where people look when they view an image or a scene. The data provides information on visual preferences and on what they find appealing. Eye tracking revealed that deeper nasolabial folds made female individuals less attractive. If they smile, the attractiveness and youthfulness were brought back [8].

Complete dentures and soft tissue profile

Complete dentures are provided with a view to restore soft tissue contour. However, complete dentures, may not provide the results fully. Rehabilitation achieved through prosthodontics makes the face shorter. The facial profile becomes flatter with complete denture wearers. The vermillion visibility is greatly affected in

complete denture wearers because the lips are not adequately supported by the denture teeth. Nasolabial fold is not prominent in denture wearers mainly because of the flaccidity of the lips. Upper lip support is usually guided by the nasolabial angle and the vermillion visibility. On most of the occasions, vertical dimension of the face is not successfully restored with complete dentures. In due course, the vertical height gets reduced because of the resorption of alveolar bone (Figure 8,9) [9].



Figure 8: With adequate lip support, the upper vermilion will be visible.

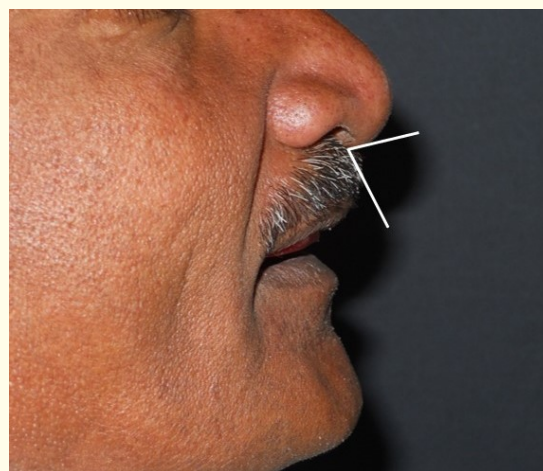


Figure 9: Nasolabial angle.

Nasolabial fold is considered as an aesthetic and anatomic landmark especially when dentures are fabricated. Lips and cheeks which usually get collapsed during the edentulous phase, get back the morphology to an extent by a well contoured denture. Attempts to eliminate nasolabial fold with a thick denture flange may land up in artificiality.

Botox in the treatment of wrinkles

Botox injections relax the muscles that cause wrinkles and the appearance improves. Botox is a popularly used brand of botulinum toxin injection. It is a neurotoxin that affects the nerves and the related muscles are weakened. A bacterium called *Clostridium botulinum* (type A) makes the neurotoxin. Qualified specialists inject small quantity of the toxin to smoothen the wrinkles of the skin. When Botox is injected, nerve signals to the muscles are blocked and hence the related muscle cannot contract. The effect is not permanent and may last for a few months. Individuals who are concerned about wrinkles and other signs of aging that appear on different regions of the face opt for Botox treatment. This has been in use for medical conditions like excessive sweating, migraine, overactive bladder and different types of pain. Administration of Botox is an outpatient procedure and may cause minor side effects like head ache, neck pain, stomach upset etc and will disappear in a few days. Botox is relatively safe but should not be administered in pregnant and lactating women. The injections are strategically placed in the specific muscle groups which create wrinkles and thereby desired cosmetic effect is achieved [10] (Figure 10).

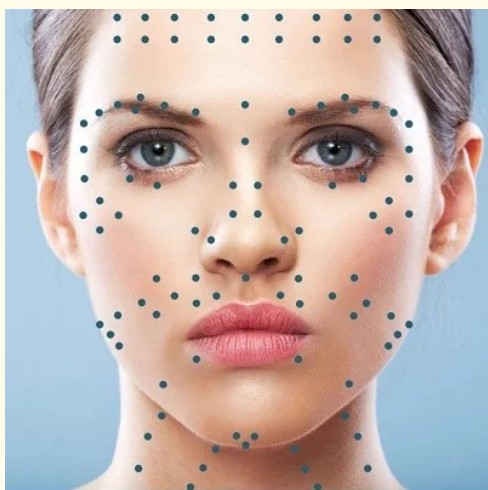


Figure 10: Botox injection sites on the face.

Facial exercises

The skin quality of face like elasticity and contour depends greatly on the tone of facial muscles. Facial muscles require toning up by administering appropriate exercises. A few exercises are described below:

- **Exercise 1:** This is a warming up exercise for facial muscles. Adopt a standing or sitting position, keeping the back straight. Now try to sing different vowels as long as an individual can. Singing I, O, E and A usually works best. Continue doing this exercise until a warmth is felt on the face completely (Figure 11).
- **Exercise 2:** Sit and tilt the head back. Now imagine to reach the ceiling with the lower lip. Stick out the lower lip as far as possible and hold for 5-10 seconds. Then take a short break, and repeat 2-3 times (Figure 12).
- **Exercise 3:** Cross the arms over the chest and raise the chin while standing straight. Take a deep breath and count 10 or 15. Then slowly return to the starting position (Figure 13).
- **Exercise 4:** This exercise improves the elasticity of the cheeks. Make sure you keep the head straight during this exercise. Pull the corners of the lips down and return to the starting position. Repeat at least 5 times, until some tension is felt in the muscles (Figure 14).
- **Exercise 5:** Sit straight, and hold a pencil with the lips and try to write your name in the air without moving the head. Keep doing this exercise for at least 3 minutes (Figure 15).
- **Exercise 6:** This exercise helps to tone up the muscles around the face and the neck. Tilt the head to the right and try to reach the shoulder with the ear. Press the right hand against the right side of the head, while resisting with the head and neck. Hold for 10 seconds, and repeat with the other side (Figure 16).
- **Exercise 7:** Suck in a mouthful of air and close the lips. Put the hands on the cheeks and start pushing against the cheeks. Hold for 5-10 seconds. Then take a short break, and repeat 5-6 times (Figure 17).
- **Exercise 8:** Open the mouth and cover the teeth with the lips. Move the lower jaw forward, and push the chin with a finger. Repeat 10 times (Figure 18).



Figure 11: Warming up exercise.



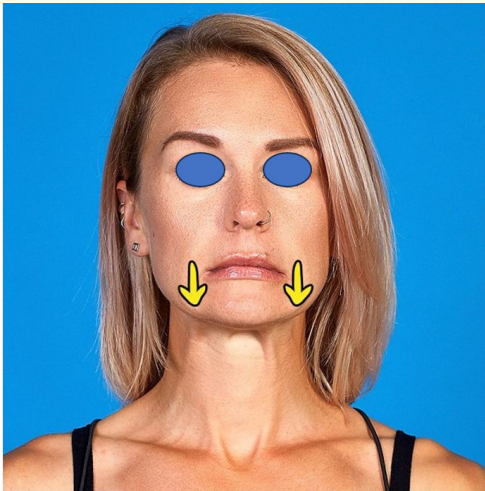
Cross the arms, raise the chin, inhale and hold for 10 to 15 seconds

Figure 13: Cross arms, raise the chin and take a deep breath.



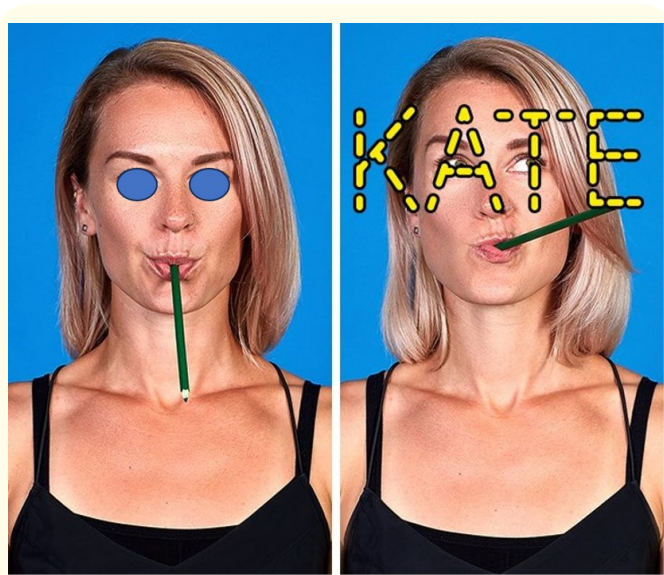
Hold the position for 5 to 10 seconds.
Repeat it 3 times

Figure 12: Hold the head back and protrude the lower lip.



Keep the angles of the mouth down and repeat it 5 times

Figure 14: Keep the head straight and pull the angles of the mouth down 5 times.



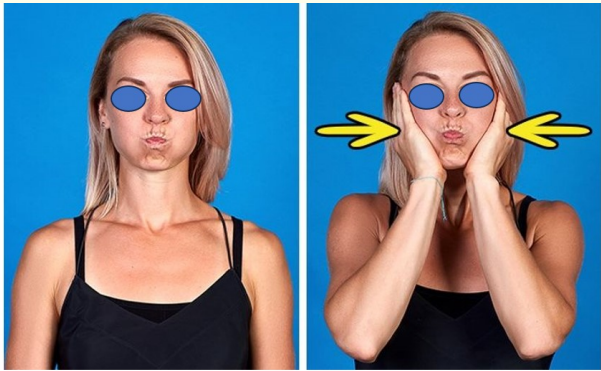
Hold a pencil with the lips and write the name in the air for 3 minutes

Figure 15: Hold a pencil with the lips and write the name in the air.



Tilt the head to one side and resist it with the hand and hold for 10 seconds. Repeat It with the other side

Figure 16: Tilt the head to one side and resist it with the hand. Repeat on the other side.



Suck in mouthful of air and press the cheeks with both the hands for 10 seconds

Figure 17: Suck mouth full of air and close the lips.Press the cheeks with hands.



Open the mouth and cover the teeth with lips. Move the lower jaw forward and press the chin with a finger

Figure 18: Cover the teeth with lips, push the mandible forward against finger pressure.



Press the fists under the chin and press the floor of the mouth with tongue

Figure 19: Press the chin with the fists and press the floor of the mouth with the tongue.

- **Exercise 9:** Press both of the fists under the chin and press the tongue against the floor of the mouth (beside the lower teeth). Push the chin up with the fists, while resisting that pressure with the tongue. Hold for 30 seconds. Repeat 10 times (Figure 19) [11,12].

Discussion and Conclusions

Nasolabial folds are lines that extend from the ala of the nose to the angle of the mouth. These lines or folds become more prominent with advancing age. Specific reasons for this change are related to innate genetic factors, loss of collagen, smoking and exposure to direct sun light. Treatment methods include invasive, non-invasive and preventive methods [11].

Hyaluronic acid based dermal filler is injected to the skin to plump it and the depth of the nasolabial fold gets reduced. It is a less time-consuming procedure at the same time provides immediate results. Smooth surfaced skin provides satisfaction to those who receive the treatment. Botox injections relax the muscles adjacent to the nasolabial folds. It is a minimally invasive procedure and very effective for minor folds. The effect of treatment may last for about six months [10].

Laser resurfacing of the skin promotes collagen production and which tightens the skin. The results may last longer with multiple sessions. Microneedling is a procedure of creating micro injuries, stimulates collagen and improves skin texture. Results will be visible gradually. Chemical peels exfoliate the superficial skin layers and makes the skin smoother. It may cause redness of the skin for a short period. This is usually combined along with other treatment methods. Radio frequency therapy which heats the skin also promotes collagen production. The results are subtle and may require multiple sessions [13].

Facelift surgery tightens the skin significantly and thereby reduces the nasolabial fold. The results are dramatic and long lasting. Recovery requires long duration and the results provide youthfulness very effectively. Fat transfer is another invasive procedure in which fat from one part of the body is harvested and is injected to the defective areas viz nasolabial folds.

Topical application of retinoid creams stimulates collagen production and improves the elasticity of the skin. Only gradual improvement can be expected.

Advancement in treatment methods have undergone revolutionary transformations in the recent past and the results obtained are excellent which could not even be imagined in the past.

Conflict of Interest

The authors declare that they do not have any conflict of interest.

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