



Medical Coverage Policy

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Injectable Fillers

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INSTRUCTIONS FOR USE

The following Coverage Policy applies to health benefit plans administered by Cigna Companies. Certain Cigna Companies and/or lines of business only provide utilization review services to clients and do not make coverage determinations. References to standard benefit plan language and coverage determinations do not apply to those clients. Coverage Policies are intended to provide guidance in interpreting certain standard benefit plans administered by Cigna Companies. Please note, the terms of a customer's particular benefit plan document [Group Service Agreement, Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a customer's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a customer's benefit plan document always supersedes the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Each coverage request should be reviewed on its own merits. Medical directors are expected to exercise clinical judgment and have discretion in making individual coverage determinations. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. In certain markets, delegated vendor guidelines may be used to support medical necessity and other coverage determinations.

Overview

This Coverage Policy addresses injection materials used for the treatment of vocal cord paralysis and facial lipodystrophy syndrome.

Coverage Policy

Vocal Cord Paralysis

Laryngeal injection of ANY of the following is considered medically necessary for the treatment of unilateral vocal cord paralysis:

- calcium hydroxylapatite (e.g., Radiesse™ Voice, Prolarynx™ Plus)
- autologous fat
- bulking agents specifically approved by the U.S. Food and Drug Administration (FDA) for the treatment of unilateral vocal cord paralysis

Laryngeal injection of hyaluronic acid with or without lidocaine (e.g., Restylane®) or any other injectable filler is considered experimental, investigational or unproven for the treatment of unilateral vocal cord paralysis.

Facial Lipodystrophy Syndrome

Injectable fillers approved by the Food and Drug Administration (FDA) (e.g., Sculptra or Radiesse) are considered medically necessary for the treatment of photographically documented facial lipodystrophy syndrome caused by antiretroviral therapy in HIV-infected persons.

Not Medically Necessary

Injectable fillers including calcium hydroxylapatite, autologous fat*, collagen, hyaluronic acid and poly-L-lactic acid, are considered cosmetic and not medically necessary for ANY other indication.

***This coverage policy is not intended to address the use of autologous fat transplant for breast reconstruction. For coverage criteria specific to breast reconstruction services, refer to the Breast Reconstruction Following Mastectomy or Lumpectomy Coverage Policy.**

General Background

Injectable fillers also referred to as injectable dermal or soft tissue fillers, are substances used to restore tissue volume loss caused by factors such as aging, lipoatrophy, injury or trauma. A wide variety of injectable fillers are available for clinical use, including products that break down over time (e.g., hyaluronic acid, collagen, calcium hydroxylapatite, and poly-L-lactic acid), products that remain indefinitely in tissue (e.g., polymethylmethacrylate microspheres, hydrogel polymers, and silicone), and autologous fat (Carruthers, et al., 2022).

Injectable soft tissue fillers play a role in the correction of defects that result from medical disorders, trauma, or surgery. A number of injectable fillers including autologous fat are used for medical purposes in non-facial areas such as nipple contouring, and improvement of chest wall defects after mastectomy and breast reconstruction (Carruthers, et al., 2022). Depending on the severity of defects or scarring, revision may aid in restoration of function, however treatment of scars is typically aimed at improving physical appearance, and as such be considered cosmetic. Treatments intended to improve personal appearance or that do not improve functional deficits are considered cosmetic in nature. The majority of injectable fillers can be divided into the following categories:

- Calcium hydroxylapatite microsphere (e.g., Radiesse, Prolaryn)
- Collagen (e.g., Cosmoderm, Evolence, Fibrel, Zyplast, Zyderm)
- Hyaluronic acid (e.g., Restylane, Perlane, Juvederm Ultra, Elevess, Prevelle Silk, Teosyal, Revanesse Ultra, Hylaform B Gel, Captique, Artefill, Beletero Balance)
- Poly-L-lactic acid (e.g., Sculptra)

Vocal Cord Paralysis

Laryngeal injections of select injectable fillers, also referred to as bulking agents, have been proven to be effective in treating glottis insufficiency or vocal cord dysfunction. Vocal cord (or fold) paresis or paralysis is a result of abnormal nerve input to the voice box muscles (i.e., laryngeal muscles). Vocal cord paresis/paralysis can occur at any age from a variety of causes (e.g., injury, trauma; tumors, viral infections) (American Academy of Otolaryngology Head and Neck Surgery [AAOHNS], 2018). The symptoms of vocal cord paralysis/paresis are voice changes, and airway and swallowing problems. Glottis insufficiency, which may be secondary to vocal cord paralysis, atrophy, or scarring, is a condition that leaves patients with phonatory compromise in both voice frequency and intensity. Proposed techniques for managing vocal cord paralysis include voice therapy, laryngeal framework surgery, reinnervation surgery, medialization thyroplasty, and injection laryngoplasty (Bruch and Kamani, 2021; Lorenz, et al., 2007; Kwon, et al., 2004). Laryngeal reinnervation has been performed with varying degrees of success. Medialization thyroplasty involves transcervical placement of an implant (e.g.,

silicone, Gore-Tex) through a surgically created window in the thyroid cartilage (Bruch and Kamani, 2021). Injectable agents proposed for treatment include autologous fat, calcium hydroxylapatite, hyaluronic acid, and collagen. Injection of these substances changes the position of the vocal folds, repositioning the laryngeal cartilage and bringing the vocal folds closer together. This procedure usually results in a stronger voice.

U.S. Food and Drug Administration (FDA): The Radiesse Laryngeal Implant (calcium hydroxylapatite) (BioForm Medical Inc.) obtained clearance from the FDA through the 510(k) approval process, as substantially equivalent to the predicate device on March 1, 2007. According to the FDA, the Radiesse Laryngeal Implant is indicated for vocal fold medialization and treatment of vocal fold insufficiency that can be improved by injection of a soft-tissue bulking agent. The Radiesse Laryngeal Implant is intended to augment the size of the displaced or deformed vocal fold so that it may meet the opposing vocal fold at the midline for improved phonation. Vocal fold insufficiency associated with serious aspiration difficulties may be an urgent indication for a Radiesse Laryngeal Implant (FDA, 2007). In February 2010, Merz Aesthetics Inc. acquired BioForm Medical Inc. Merz Aesthetics Inc. manufactures Radiesse Laryngeal Implant under the names Prolaryn Gel and Prolaryn Plus.

Multiple bulking agents have been approved by the U. S. Food and Drug Administration (FDA) through the 510(k) process for the treatment of unilateral vocal cord paralysis. Manufacturers include Sofregen Medical (Medford, MA), Cytophil (East Troy, WI), Coapt Systems (Palo Alto, CA) and Bioform Medical (San Mateo, CA). According to the FDA, the product code dedicated to bulking agents for vocal cord medialization is MIX.

On March 25, 2005 Medicis Aesthetics Inc received PMA device approval for Restylane Injectable Gel for mid-to deep dermal implantation for the correction of moderate to severe facial wrinkles and folds, such as nasolabial folds. Allergan received PMA device approval for the Juvederm collection of dermal fillers for the correction of facial wrinkles and folds. Restylane and Juvaderm are not approved by the FDA for the treatment of vocal cord paralysis and therefore the use for this indication would be considered off-label and unproven.

Literature Review

Calcium Hydroxylapatite: Synthetic calcium hydroxylapatite (CaHA) (e.g., Radiesse™, Prolaryn) has biocompatibility properties that create no antigenic or inflammatory responses. CaHA is formed from calcium and phosphorus ions, which are natural to human teeth and bones (Rosen, 2004). The goal of the Radiesse injection is to augment a vocal fold to improve glottic closure, thereby improving phonation and voice quality. The principle component is synthetic CaHA, which is made up of small particles which are similar to naturally occurring CaHA. The semi-solid nature of Radiesse is due to the suspension of the CaHA particles in a gel carrier composed of water, glycerine, and a small amount of sodium carboxymethylcellulose. For cosmetic purposes, the CaHA is injected in the desired area and then gradually disappears over a period of three to four months. New collagen is formed as the substance is absorbed by the body.

Autologous Fat: Autologous fat injections have been used as an injection material since the later 1980s and early 1990s. The effectiveness, availability, biocompatibility, and low rate of complications of the autologous fat have contributed to its widespread use. Fat offers similar viscoelastic properties to those of the vocal cord tissue. The disadvantage of fat injection is the unpredictable rate and degree of resorption, which limits the predictability of long-term outcomes, and repeat injections are often required (Courey, 2004; Kwon, et al., 2004). Although there is a lack of long-term comparative outcome studies of fat injections as an implant material for vocal cord medialization and augmentation, there is sufficient evidence in the published, peer-reviewed medical literature that in carefully selected patients, fat injections may be beneficial for short-term treatment for unilateral laryngeal nerve paralysis (Fang, et al., 2010; Umeno, et al., 2005; Laccourreye, et al., 2003; McCulloch, et al., 2002; Laccourreye, et al., 1999).

Hyaluronic Acid: Hyaluronic acid is a protective, lubricating and binding gel substance that is produced naturally by the body (e.g., Restylane, Juvederm). Hyaluronic acid is hydrophilic or attracted to water. Injection of the substance results in a smooth surface at the affected area. Restylane injectable gel is a transparent hyaluronic acid gel that is typically injected into facial tissue to smooth wrinkles and folds, especially around the nose and mouth (nasolabial folds). Juvederm is a colorless hyaluronic acid gel that is injected into areas of facial tissue where moderate to severe facial wrinkles and folds occur, especially around the nose and mouth. Due to a lack of well-designed studies with sufficient sample sizes in the published, peer-reviewed medical literature, hyaluronic acid is unproven for the treatment of vocal cord paralysis.

Collagen: A variety of collagen products have been used in research studies, for example biochemical cross-linked products and purified bovine collagen. A micronized form of Alloderm tissue, Cymetra® (LifeCell Corporation, Branchburg, NJ) has been studied for injection laryngoplasty. It is processed from human tissue obtained from tissue banks and is therefore, classified by the FDA as human tissue for transplantation. The classification is not specific to use of Cymetra in conjunction with laryngoplasty. The allograft tissue is processed into a particulate acellular dermal matrix, dried and placed in a syringe. It is to be used in transplantation for the repair or replacement of damaged or inadequate integumental tissues (e.g., correction of soft-tissue defects and depressed scars, replacement of integumental tissue lost through atrophy). Cymetra is proposed for the treatment of vocal fold scars and medialization of vocal folds following thyroplasty. Due to resorption, repeated injections may be indicated (Simpson, et al., 2008; Remacle and Lawson, 2007; Simpson, 2006).

Due to a lack of well-designed studies with sufficient sample sizes in the published, peer-reviewed medical literature, Cymetra is unproven for the treatment of vocal cord paralysis.

Facial Lipodystrophy Syndrome

Facial lipodystrophy syndrome (LDS) is characterized by a localized loss of fat from the face, resulting in excessively sunken cheeks. The condition may occur as a side effect of antiretroviral therapy used in the HIV infection treatment regimen. Facial LDS can be socially stigmatizing and may impact patients' adherence to highly active antiretroviral therapy (HAART), psychological health, and quality of life (QoL), including feelings of distress, depression, anxiety, social isolation, and career barriers. Although new HAART medications are associated with less severe facial LDS, the prevalence of HIV facial LDS among treated individuals exceeds 50%. Treatment of HIV facial LDS is linked to improvement in the QoL of patients in health perception, mental health, social function, and emotional status (Jagdeo, et al., 2015). The FDA has approved two dermal fillers, Sculptra® and Radiesse® that are indicated for facial lipoatrophy, a component of HIV LDS.

U.S. Food and Drug Administration (FDA): On August 3, 2004, the FDA granted PMA device approval for Sculptra® (Dermik Laboratories, Berwyn, PA). According to the FDA, Sculptra is intended for restoration and/or correction of the signs of facial fat loss (lipoatrophy) in people with human immunodeficiency virus (FDA, 2004). Sculptra Aesthetic received FDA PMA approval on July 28, 2009. Sculptra Aesthetic is indicated for use in immune-competent individuals as a single regimen for correction of shallow to deep nasolabial fold contour deficiencies and other facial wrinkles in which deep dermal grid pattern (cross-hatch) injection technique is appropriate (FDA, 2009). Radiesse (Mertz North America, Inc) was granted PMA device approval on December 22, 2006. The device is indicated for subdermal implantation for restoration and/or correction of the signs of facial fat loss (lipoatrophy) in people with human immunodeficiency virus (FDA, 2006).

Literature Review

Moyle et al. (2006) conducted a randomized, open-label, comparative, single-center study that evaluated the safety and efficacy of injected poly-L-lactic acid (PLLA) in the correction HIV-related facial lipoatrophy. Patients (n=30) were randomized to immediate (n=15) or delayed (n=15) PLLA treatment. Patients were included if they were HIV positive, had moderate to severe nasolabial fat pad loss and no previous treatment for the correction of their HIV associated lipoatrophy. At week 12, immediate treatment patients had significantly better visual analogue scores (p<0.001) and lower anxiety scores (p=0.056) than delayed-treatment patients. The results persisted until week 24. The study was extended from 24 weeks to 18 months and included a recall visit at 18 months. Twenty-seven patients returned for the recall visit, a minimum of 18 months post final study treatment. Fourteen of these patients were excluded from the recall visit because of additional treatment with PLLA. Improvements in VAS scores for facial appearance were sustained from baseline to the recall visit in both randomization groups (p<0.05 and p<0.001). The delayed PLLA treatment group also experienced significant improvements in depressive symptoms (p<0.05). One case of injection-site induration and nine cases of injection-site nodules were noted at the recall visit, none of which was described as serious or severe. The authors concluded that physical and psychological benefits of PLLA are sustained over 18 months.

Silvers at al. (2006) reported the results of a prospective open-label, multi-center study that evaluated the safety and effectiveness of Radiesse for the treatment of facial lipoatrophy in patients with human immunodeficiency virus (HIV). Patients (n=100) received an initial treatment and six months later, all patients were assessed for the need for a touch up injection. Effectiveness was assessed at three, six and 12 months from initial treatment by

means of a Global Aesthetic Improvement Scale (GAIS) rating, cheek skin thickness measurements, and patient satisfaction assessment. Safety was assessed by the recording of adverse events through 12 months. All 100 patients were determined to be improved or better at three months. One hundred percent of assessable patients were rated as improved or better on the GAIS scale at every time point through 12 months; 91% were improved or better at 18 months. Patient satisfaction ranged from 97%–100% at every evaluation through 12 months. In addition, skin thickness measurements at 12 months remained statistically better than those at baseline. Adverse events reported through 12 months were generally mild (ecchymosis, edema, erythema, pain, and pruritus), and short in duration. Mean cheek thickness doubled in six months and was maintained over 12 months.

Several prospective non-randomized trials and systematic reviews have demonstrated Sculptra and Radisse are effective treatment modalities for human immunodeficiency virus associated facial lipoatrophy, with high rates of facial volume restoration, patient satisfaction and improved quality of life. Results appear to be long lasting and correction can be maintained for up to three years with additional treatment sessions (Vallejo, et al, 2018; Ho & Jagdeo, 2016; Kraus, et al., 2016; Jagdeo, et al., 2015; Shuck, et al., 2013; Levy, et al., 2008; Lafaurie, et al., 2005).

Not Medically Necessary

The use of injectable dermal fillers has aesthetic applications such as providing volume for wrinkles around the eyes, cheeks, lips, and neck, thereby improving appearance. When performed solely for the purpose of altering appearance or self-esteem or to treat psychological symptomatology or psychosocial complaints related to one's appearance, injectable dermal fillers are considered cosmetic and not medically necessary. Examples of indications for which injectable fillers are considered cosmetic include but are not limited to the following:

- body contouring and sculpting
- rhytidy (i.e., wrinkles)
- scarring (e.g., due to acne vulgaris)
- tissue volume loss (e.g., due to aging)

Poly-L-lactic acid (PLLA): PLLA (e.g., Sculptra) is a biocompatible polymer that contains microspheres in a powdered form. PLLA is mixed with water or lidocaine prior to injection. Like CaHA, the mechanism of action of PLLA is thought to involve a stimulation of new collagen production while the implant breaks down to lactic acid and is reabsorbed by the body. The average duration of the effect is 12 to 24 months. Indications for PLLA are primarily cosmetic.

Although PLLA is used in a number of surgical procedures, the substance has not been approved by the FDA for vocal cord dysfunction. As such use for this indication would be considered off-label and unproven.

U.S. Food and Drug Administration (FDA): The FDA has approved numerous injectable dermal fillers and volume-producing agents for treatment localized to the face in order to create a smoother appearance. "The Summary of Safety and Effectiveness Data as well as health care provider and patient labeling for each approved dermal filler may be found by searching the 510(k) premarket notification database for product code "LMH" (dermal fillers for the face) and "PKY" (dermal fillers for the hand)" (FDA, 2020).

Professional Societies/Organizations

Professional societies/organizations such as the American Society of Plastic Surgeons (ASPS) and the American Academy of Dermatology (AAD) provide information regarding treatments aimed at improving appearance. Specific recommendations for dermal fillers such as a formal guideline or a position statement could not be found.

Use Outside of the US

No relevant information.

Medicare Coverage Determinations

	Contractor	Determination Name/Number	Revision Effective Date
NCD	National	Dermal Injections for the Treatment of Facial Lipodystrophy Syndrome (LDS) (250.5)	3/23/2010
LCD	Wisconsin Physicians Service Insurance Corporation	Cosmetic and Reconstructive Surgery (L34698)	1/01/2021

Note: Please review the current Medicare Policy for the most up-to-date information.
(NCD = National Coverage Determination; LCD = Local Coverage Determination)

Coding Information

Note: 1) This list of codes may not be all-inclusive.

2) Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

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2) Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement.

Vocal Cord Paralysis

Considered Medically Necessary when criteria in the applicable policy statements listed above are met:

CPT®* Codes	Description
31513	Laryngoscopy, indirect; with vocal cord injection
31570	Laryngoscopy, direct, with injection into vocal cord(s), therapeutic;
31571	Laryngoscopy, direct, with injection into vocal cord(s), therapeutic; with operating microscope or telescope
31573	Laryngoscopy, flexible; with therapeutic injection(s) (eg, chemodenevation agent or corticosteroid, injected percutaneous, transoral, or via endoscope channel), unilateral
31574	Laryngoscopy, flexible; with injection(s) for augmentation (eg, percutaneous, transoral), unilateral

HCPCS Codes	Description
C1878	Material for vocal cord medialization, synthetic (implantable)
J3590	Unclassified biologics
L8607	Injectable bulking agent for vocal cord medialization, 0.1 ml, includes shipping and necessary supplies
Q2026	Injection, Radiesse, 0.1 ml

Considered Experimental/Investigational/Unproven:

HCPCS Codes	Description
Q4112	Cymetra, injectable, 1 cc

Facial Lipodystrophy Syndrome

Considered Medically Necessary when criteria in the applicable policy statements listed above are met:

HCPCS Codes	Description
G0429	Dermal filler injection(s) for the treatment of facial lipodystrophy syndrome (LDS) (e.g., as a result of highly active antiretroviral therapy)
Q2026	Injection, Radiesse, 0.1 ml
Q2028	Injection, Sculptra, 0.5 mg

Considered Not Medically Necessary:

CPT® Codes	Description
11950	Subcutaneous injection of filling material (eg, collagen); 1 cc or less
11951	Subcutaneous injection of filling material (eg, collagen); 1.1 to 5.0 cc
11952	Subcutaneous injection of filling material (eg, collagen); 5.1 to 10.0 cc
11954	Subcutaneous injection of filling material (eg, collagen); over 10.0 cc

***Current Procedural Terminology (CPT®) ©2022 American Medical Association: Chicago, IL.**

References

1. American Academy of Dermatology (AAD). Fillers: Overview. © 2023. Accessed on March 7, 2023. Available at URL address: <https://www.aad.org/public/diseases/cosmetic-treatments/fillers>
2. American Academy of Otolaryngology Head and Neck Surgery. Fact sheet: Vocal Cord Paralysis: Patient Health Information. © 2021. Last reviewed August 2018. Accessed March 7, 2023. Available at URL address: <http://www.entnet.org/content/vocal-cord-paralysis>
3. Bruch JM, Kamani DV. Hoarseness in adults. In: UpToDate, Deschler DG (Ed), UpToDate, Waltham, MA. Literature review current through: February 2023. Last updated June 14, 2021. Accessed on March 7, 2023.
4. Carruthers J, Humphrey S. Injectable soft tissue fillers: Overview of clinical use. In: UpToDate, Dover JS, Colwell AS (Eds). Literature review current through February 2023. Last updated May 10, 2022. Accessed on March 7, 2023.
5. Centers for Medicare and Medicaid Services (CMS). Local Coverage Determinations (LCDs) alphabetical index. Accessed March 7, 2023. Available at URL address: <https://www.cms.gov/medicare-coverage-database/indexes/lcd-alphabetical-index.aspx>
6. Centers for Medicare and Medicaid Services (CMS). National Coverage Determinations (NCDs) alphabetical index. Accessed March 7, 2023. Available at URL address: <https://www.cms.gov/medicare-coverage-database/indexes/ncd-alphabetical-index.aspx>
7. Courey MS. Injection laryngoplasty. Otolaryngol Clin North Am. 2004 Feb;37(1):121-38.
8. Eppley BL, Dadvand B. Injectable soft-tissue fillers: clinical overview. Plast Reconstr Surg. 2006 Sep 15;118(4):98e-106e.
9. Fang TJ, Li HY, Gliklich RE, Chen YH, Wang PC, Chuang HF. Outcomes of fat injection laryngoplasty in unilateral vocal cord paralysis. Arch Otolaryngol Head Neck Surg. 2010 May;136(5):457-62.

10. Hamdan AL, Khalifee E. Adverse Reaction to Restylane: A Review of 63 Cases of Injection Laryngoplasty. *Ear Nose Throat J*. 2019 Apr-May;98(4):212-216.
11. Ho D, Jagdeo J. Patient reported outcomes from HIV facial lipoatrophy treatment with a volumizing hyaluronic acid filler: a prospective, open-label, phase I and II study. *J Drugs Dermatol*. 2016 Sep 1;15(9):1064-9.
12. Jagdeo J, Ho D, Lo A, et al. A systematic review of filler agents for aesthetic treatment of HIV facial lipoatrophy (FLA). *J Am Acad Dermatol*. 2015 Dec;73(6):1040-54.e14.
13. Kraus CN, Chapman LW, Korta DZ, Zachary CB. Quality of life outcomes associated with treatment of human immunodeficiency virus (HIV) facial lipoatrophy. *Int J Dermatol*. 2016 Dec;55(12):1311-1320.
14. Kwon TK, Buckmire R. Injection laryngoplasty for management of unilateral vocal fold paralysis. *Curr Opin Otolaryngol Head Neck Surg*. 2004 Dec;12(6):538-42.
15. Laccourreye O, Paczona R, Ageel M, Hans S, Brasnu D, Crevier-Buchman L. Intracordal autologous fat injection for aspiration after recurrent laryngeal nerve paralysis. *Eur Arch Otorhinolaryngol*. 1999;256(9):458-61.
16. Laccourreye O, Papon JF, Kania R, Crevier-Buchman L, Brasnu D, Hans S. Intracordal injection of autologous fat in patients with unilateral laryngeal nerve paralysis: long-term results from the patient's perspective. *Laryngoscope*. 2003 Mar;113(3):541-5.
17. Lafaurie M, Dolivo M, Porcher R, et al. Treatment of facial lipoatrophy with intradermal injections of poly-lactic acid in HIV-infected patients. *J Acquir Immune Defic Syndr*. 2005;38(4):393-398.
18. Levy RM, Redbord KP, Hanke CW. Treatment of HIV lipoatrophy and lipoatrophy of aging with poly-L-lactic acid: a prospective 3-year follow-up study. *J Am Acad Dermatol*. 2008 Dec;59(6):923-33.
19. Lorenz RR, Netterville JL, Burkey BB. Vocal Cord Paralysis. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. *Sabiston Textbook of Surgery. The Biological Basis of Modern Surgical Practice*. 18th ed. St Louis, MO: W.B. Saunders; 2007. Ch 33.
20. Luebberding S, Alexiades-Armenakas M. Facial volume augmentation in 2014: overview of different filler options. *J Drugs Dermatol*. 2013 Dec;12(12):1339-44.
21. Merz Pharma Group. Merz to Complete Acquisition of BioForm Medical [news release]. February 19, 2010. Business Wire [website]. Accessed March 7, 2023. Available at: <https://www.businesswire.com/news/home/20110224005422/en/Merz-Pharmaceutical%E2%80%99s-Acquisition-of-BioForm-Medical-Positions-It-for-Global-Growth>
22. Mest DR, Humble GM. Retreatment with injectable poly-L-lactic acid for HIV-associated facial lipoatrophy: 24-month extension of the Blue Pacific study. *Dermatol Surg*. 2009;35 Suppl 1:350-359.
23. McCulloch TM, Andrews BT, Hoffman HT, Graham SM, Karnell MP, Minnick C. Long-term follow-up of fat injection laryngoplasty for unilateral vocal cord paralysis. *Laryngoscope*. 2002 Jul;112(7 Pt 1):1235-8.
24. Moyle GJ, Brown S, Lysakova L, Barton SE. Long-term safety and efficacy of poly-L-lactic acid in the treatment of HIV-related facial lipoatrophy. *HIV Med*. 2006 Apr; 7(3): 181-5.
25. Moyle GJ, Lysakova L, Brown S, Sibtain N, Healy J, Priest C, et al. A randomized open-label study of immediate versus delayed poly-lactic acid injections for the cosmetic management of facial lipoatrophy in persons with HIV infection. *HIV Med*. 2004 Mar;5(2):82-7.

26. Reksodiputro MH, Hutauruk SM, Koento T, Fardizza F, Hakim RYR, Audindra S, et al. Randomised clinical trial: Effect of administering platelet-rich fibrin to autologous fat tissue in injection laryngoplasty for vocal cord paralysis. *Ann Med Surg (Lond)*. 2021 Jul 16;68:102564.
27. Remacle M, Lawson G. Results with collagen injection into the vocal folds for medialization. *Curr Opin Otolaryngol Head Neck Surg*. 2007 Jun;15(3):148-52.
28. Rosen CA, Gartner-Schmidt J, Casiano R, Anderson TD, Johnson F, Remacle M, et al. Vocal fold augmentation with calcium hydroxylapatite: twelve-month report. *Laryngoscope*. 2009 May;119(5):1033-41
29. Rosen CA, Gartner-Schmidt J, Casiano R, Anderson TD, Johnson F, Reussner L, et al. Vocal fold augmentation with calcium hydroxylapatite (CaHA). *Otolaryngol Head Neck Surg*. 2007 Feb;136(2):198-204.
30. Rosen CA, Thekdi AA. Vocal fold augmentation with injectable calcium hydroxylapatite: short-term results. *J Voice*. 2004 Sep;18(3):387-91.
31. Shuck J, Iorio ML, Hung R, Davison SP. Autologous fat grafting and injectable dermal fillers for human immunodeficiency virus-associated facial lipodystrophy: a comparison of safety, efficacy, and long-term treatment outcomes. *Plast Reconstr Surg*. 2013; 131(3):499-506.
32. Silvers SL, Eviatar JA, Echavez MI et al. Prospective, open-label, 18-month trial of calcium hydroxylapatite (Radiesse) for facial soft-tissue augmentation in patients with human immunodeficiency virus-associated lipoatrophy: one-year durability. *Plast Reconstr Surg*. 2006 Sep;118(3 Suppl):34S-45S.
33. Simpson B, Rosen C, von Leden H, Ossoff, RF. 14.4.2 Categories of vocal fold augmentation materials. In: *Operative Techniques in Laryngology*. Springer, 2008.
34. Simpson CB. Ch 61. Treatment of vocal fold paralysis. In: *Head & neck surgery – otolaryngology*. Lippincott, Williams & Wilkins. 2006. Pgs 847-848.
35. Umeno H, Shirouzu H, Chitose S, Nakashima T. Analysis of voice function following autologous fat injection for vocal fold paralysis. *Otolaryngol Head Neck Surg*. 2005 Jan;132(1):103-7.
36. U.S. Food and Drug Administration (FDA). Center for Devices and Radiological Health (CDRH). FDA-Approved Dermal Fillers. Last Updated: November 9, 2020. Accessed March 7, 2023. Available at URL address: <https://www.fda.gov/medical-devices/aesthetic-cosmetic-devices/fda-approved-dermal-fillers#materials>
37. U.S. Food and Drug Administration (FDA). 510(k) summary. Center for Devices and Radiological Health (CDRH). K060815. Juliesse™ Injectable Laryngeal Implant. 2006 April. Accessed March 7, 2023. Available at URL address: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm?id=k060815>
38. U. S. Food and Drug Administration (FDA). 510(k) premarket notification database. Product code MIX. Accessed March 7, 2023. Available at URL address: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm>
39. U.S. Food and Drug Administration (FDA). 510(k) summary. Center for Devices and Radiological Health (CDRH). 510(k) summary. Laryngeal Augmentation Implant. 2003 December. Accessed March 7, 2023. Available at URL address: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm?ID=K033398>

40. U.S. Food and Drug Administration (FDA). 510(k) summary. Center for Devices and Radiological Health (CDRH). K070090. Radiesse™ laryngeal implant. 2007 March. Accessed March 7, 2023. Available at URL address: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmnmn.cfm?ID=k070090>
41. U.S. Food and Drug Administration (FDA). PMA database. P800022. CosmoDerm/CosmoPlast. Supplement number 55. 2006 December. Accessed March 7, 2023. Available at URL address: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=P800022S055>
42. U.S. Food and Drug Administration (FDA). PMA database. N18286. Gelfoam® Sterile Powder. 1983 July. Accessed March 7, 2023. Available at URL address: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=N18286>
43. U.S. Food and Drug Administration (FDA). PMA database. P030032. Hylaform (Hylan B gel). 2004 April. Accessed March 7, 2023. Available at URL address: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=P030032>
44. U.S. Food and Drug Administration (FDA). PMA database. P050047. Juvederm™. 2006 June. Accessed March 7, 2023. Available at URL address: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=p050047>
45. U.S. Food and Drug Administration (FDA). PMA database. P050037. Radiesse 1.3cc and 0.3cc. 2006 December. Accessed March 7, 2023. Available at URL address: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=P050037>
46. U.S. Food and Drug Administration (FDA). PMA database. P020023. Restylane® Injectable Gel. Archived Content. 2003 December. Accessed March 7, 2023. Available at URL address: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=P020023>
47. U.S. Food and Drug Administration (FDA). PMA database. P030050. Sculptra and Sculptra Aesthetic. 2004 August. Accessed March 7, 2023. Available at URL address: <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpma/pma.cfm?id=P030050>
48. Vallejo A, Garcia-Ruano AA, Pinilla C, et al. Comparing efficacy and costs of four facial fillers in human immunodeficiency virus-associated lipodystrophy: a clinical trial. *Plast Reconstr Surg*. 2018 Mar;141(3):613-623.
49. Vila PM, Bhatt NK, Paniello RC. Early-injection laryngoplasty may lower risk of thyroplasty: A systematic review and meta-analysis. 2018 Apr;128(4):935-940.
50. Wollina U, Goldman A. Dermal fillers: facts and controversies. *Clin Dermatol*. 2013 Nov-Dec;31(6):731-6.

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