



REVIEW ARTICLE

**Progressive Development in the Field of Mesotherapy- A Review
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ABSTRACT

Mesotherapy is the specific injection technique used for the particular patient and purpose with the injection technique ranging from the very superficial to deeper injections. Conventionally only one injection is given for whatever treatment performed. Mesotherapists on other hand would give multiple smaller injections surrounding the flamed tendon usually forgoing oral medications. Although Mesotherapy treatment involves multiple injections, the total amount of medication actually given is much less than one large dose given by the traditional physician. There can be side effects as there are in any medical/surgical procedures. These in many cases can be minimized by thorough knowledge and good technique. As the prominent physicians learn of Mesotherapy's benefits which is important and must be brought into the academic setting if it is to be accepted by medical community.

KEYWORDS

Mesotherapy, Superficial, Deeper, Flamed Tendon

INTRODUCTION

Mesotherapy (from Greek mesos, "middle", and therapy from Greek therapeia, "to treat medically") is a non-surgical cosmetic medicine treatment¹. It is optimal invasive technique that employs multiple injections of pharmaceutical and homeopathic medications, plant extracts, vitamins, and other bioactive substances into the subcutaneous layer. This technique uses very small doses of compounded medications that are administered in specific areas, depending on the condition being treated. Mesotherapy injections allegedly target adipose fat cells, apparently by inducing lipolysis, rupture and cell death among adipocytes². It can be used for a variety of other conditions including sacroiliac pain, "kissing spine" discomfort, and arthritis of the back and neck.

of course, a thorough evaluation (possibly including digital radiographs) is recommended prior to injections². Other medications (such as muscle relaxants), treatment modalities, or specific joint therapies may be used in conjunction with mesotherapy. Interestingly, the term mesotherapy is used in human medicine most commonly to describe injections of various medications for cellulite reduction and "body contouring". As most chronic conditions have multiple causes, several different treatment modalities must be utilized to optimize the successful outcome of treatment. Mesotherapy can be used with essentially all traditional and natural medicine treatments. It complements the other treatments, aiding in the healing of the patient. Mesotherapy is often used in conjunction with treatments such as Prolotherapy and Neural Therapy³. Mesotherapy's other advantage is that it decreases the pain of these other injection techniques. It stimulates the repair of the mesoderm, including the skin, connective

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tissues, and adipose tissue. The injections are given into the mesoderm, which is just under the skin. It can be used for painful, as well as general medical conditions.

The History of Mesotherapy

Mesotherapy is a technique invented in 1952 by Dr. Michel Pistor (1924–2003). Multi-national research in intradermal therapy culminated with Pistor's work from 1948 to 1952 in human mesotherapy treatments^{1,3}. The French press coined the term Mesotherapy in 1958. The French Academy of Medicine recognized Mesotherapy as a Specialty of Medicine in 1987. Popular throughout European countries and South America, mesotherapy is practiced by approximately 18,000 physicians worldwide. Over the past 50+ years, in excess of 50,000 physicians worldwide have used Mesotherapy regularly for a variety of purposes, including overall weight loss, spot weight reduction, cellulite reduction, hair loss, scar revision and wrinkle elimination. In 1987, the French Academy of Medicine recognized Mesotherapy as an inherent part of traditional medicine. The International Society of Mesotherapy encompasses 14 countries throughout Europe and South America.

Mesotherapy: How It Works

Mesotherapy acts through: A reflected cutaneous stimulation induced tissue level modifications caused by the pharmacologically active substances locally injected; a possible immunity stimulation with local and general effects due to a defense mechanism outburst from the dermis elements forming part of the immunity system. The main clinical indications of mesotherapy are first of all the painful diseases, in particular the diseases of the locomotory apparatus, peripheral vascular diseases, hydrolipodistrophies, dermatological diseases, headaches. Injections are performed in the areas where the symptoms of the diseases manifest and spread out.

Intradermal Injection Procedure

This injecting technique has been used increasingly for the last 40 years all over the

world. In Italy, mesotherapy is now a part of common medical practices and is used both in the private consulting rooms and public health facilities. It represents a new method for introducing drugs into the organism. It is a therapeutic methodology belonging to allopathic or homeopathic medicine. It is a technique of intradermal injections that allows to reduce the quantity of drugs. Doses are reduced by the half or one third causing a decrease of secondary effects and iatrogenic problems⁴. At the same time there is a prolonged curative effect accompanied by a higher therapeutical effectiveness and rapidity of action. The injected drugs belong to the official Pharmacopeia and are chosen according to the general medical practice and following a traditional precise diagnosis.

Mesotherapy Benefits

Mesotherapy has many benefits; some are intrinsic, and others become obvious when mesotherapy is compared to other body sculpting techniques such as liposuction.

Mesotherapy has a wide array of uses. It is able to reduce or eliminate cellulite, as well as effectively target localized fat deposits. It can even eliminate sagging skin, treat skin conditions such as acne and stretch marks, and treat hair loss.

- Mesotherapy can effectively eliminate cellulite, unlike other treatments such as liposuction, which can actually worsen the condition.
- Unlike liposuction, mesotherapy does not cause fat to be gained in new areas.
- The rewards of mesotherapy emerge quickly. On average, mesotherapy patients see improvement in two to three sessions. Some see results after just one session.
- Mesotherapy can treat any area of the body. It can deliver precise treatment to areas such as the face, neck, and eyelids, as well as large areas like the buttocks, hips, and thighs.

- The treatment is nearly painless and no general anesthesia is necessary. Because the patient is not put under, there is no chance of anesthesia-related complications.
- Mesotherapy does not require hospitalization or downtime. Mesotherapy will not disrupt your work life or daily routine.
- The success of mesotherapy is easy to measure. You will lose inches around the treatment area. Areas formerly affected by cellulite will become smooth and firm.
- After mesotherapy, no bandages or compression garments are necessary. Healing is uncomplicated and quick, and no time off work is required.
- The side effects and risks of mesotherapy are mild, especially compared to those of liposuction and any surgery that involves general anesthesia.

Uses of Mesotherapy

Dr. Jacques Le Coz, former president of the French Society of Mesotherapy and Mesotherapist for the French National Sports Teams, has written three books on Mesotherapy, including *Mesotherapie et medecine esthetique* (Solal Publishing, France), *Mesotherapie et traumatologie sportive* (Masson Publishing, France), and *Mesotherapie en medecine generale*. Dr. Le Coz outlines more than 120 conditions that Mesotherapy has shown to be effective including the following:

- Cellulite Face & Neck Rejuvenation
- Scars
- Hyperpigmentation
- Fat Reduction
- Flaccid Skin
- Stretch Mark
- Migrane Headaches
- Wrinkles
- Tendonitis

- Scars
- Alopecia
- Arthritis
- Sports Trauma
- Hyperkeratosis
- Acne
- Bone Spurs....etc.

Mesotherapy & Aesthetic Medicine

Mesotherapy strengthens elastin fibres, stimulates collagen production, fights free radicals and stimulates cellular activity. Many Mesotherapists practice the specialty of Medical Aesthetics because of the beautifying effects it has on the skin. Wrinkles, cellulite and skin rejuvenation are the most effective complaints successfully treated with it. Mesotherapy in combination with Botox for whole face treatments are also revealing overwhelming results. The primary reason these injections are so effective for wrinkles and cellulite is that when administered correctly the injections reach not only the different layers of the skin, but the subcutaneous fat as well, helping reverse the physiology.

Cellulite

Cellulite is a condition in which abnormal "nodules" of fat form in the midsection and thighs, more commonly in women than men. This gives the appearance of a ruffling of the skin. The condition is caused by abnormal physiology in the skin and subcutaneous fat. It involves a type of insufficiency in the venolymphatic system. Mesotherapy injections are given to not only improve the venous and lymphatic flow, but to also break down the fat nodules. The solutions generally consist of a vasodilator, lymph flow stimulator, and an anesthetic. Because cellulite involves an abnormality in fat accumulation, Mesotherapy injections should be done in conjunction with a comprehensive natural medicine program designed to improve overall metabolism. This would have the effect of increasing weight loss and improving overall health. Hormone

imbalances are often at the core of the problem and need to be corrected to have maximum benefits.

Studies have Shown Mesotherapy to effectively reduce cellulite. This is due to the following facts:

1. Improves blood flow to the area...
2. Dissolves excess fat deposits...
3. Removes fibrotic, hardened connective tissue...
4. Improves lymphatic drainage...

Wrinkles

Wrinkles, like other conditions involving the skin, have a multi-factorial etiology. Excessive skin wrinkles can be caused by: overall dehydration, excessive sun exposure, genetics, facial expressions, muscle atrophy, fatty acid deficiencies, hormone imbalances, nutrient deficiencies, and many other causes. As with cellulite treatment, it is best to utilize Mesotherapy for wrinkles in the context of a comprehensive natural medicine program to correct some of the above causes. For the person with stress and increased muscle contraction in the forehead, Botox injections can be given alongside the Mesotherapy treatment.

MesoBotox

is a the term which involves injecting multiple small doses of BOTOX into the skin of the face to reduce the action of sweat and sebaceous glands as well as the superficial layer of facial muscles which are responsible for those very fine, annoying lines of the forehead or under the eyes. The net effect is improved sheen of the face with smooth skin, tighter pores and yet the ability to move all the deeper muscles of the face thus retaining a natural, non "plastic" appearance. Patient feedback has found that MesoBotox is a welcome complement to traditional BOTOX injections. Excessive wrinkles can also be a sign of advanced or aggressive aging, which emphasizes the need even more to utilize Mesotherapy, alongside of a comprehensive Mid-Life Medicine regime. This may involve the use of regenerative

therapies, natural hormone replacement, nutraceuticals, appropriate metabolic-type diet, and other Mid-Life Medicine measures. As with cellulite, Mesotherapy for wrinkles may often need to be repeated after the initial series.

Skin Rejuvenation - Mesolift

The aging process can be cruel to our skin - Between sun damage and progressive collagen loss, the skin loses its plumpness and resiliency. Mesotherapy skin rejuvenation or "Mesolift" infuses the dermis with potent vitamins and anti-oxidants to rejuvenate and revitalize the skin. The "Mesolift" is usually performed in an initial series of 2-4 treatments spaced a week apart. Results are maintained by twice a year touch up sessions.

Lipolysis - MesoSculpting - "The New Liposuction"

The Mesotherapy Treatment procedure that uses Phophatydlcholine, is known as "MesoSculpting" or "Lipodissolve" MesoSculpting for fat loss and body contouring is great news for patients who find the idea of liposuction "too much". It is also the answer to those patients who have already had liposuction and have been left with the fat deposits around the area they had the liposuction surgery done. These fat deposits post liposuction surgery is quite common. It involves microinjections using various formulas. All formulas must contain Phosphatydlcholine to achieve the lipolytic effect. The injections are given directly into the areas being treated i.e. love handles, bra bulge, saddlebags, inner thighs, arms, knees, eye fat pads, double chin etc. Results are considered permanent as long as the patient adheres to a proper nutrition and exercise regimen. Occasional touch-ups may be required.

Mesotherapy for Pain Management

Mesotherapy can be used to effectively treat muscle soreness and inflammation due to injury and to speed up recovery time. Overuse of the muscles can cause inflammation to the muscle, which can be extremely painful and healing can be a lengthy process. Normally anti-inflammatory medication is prescribed to help

with the healing process but this takes time. It allows to choose the depth at which the medication to be applied to the inflamed muscle. This will speed up the recovery process and get patient back to full activity. It can effectively treat musculoskeletal problems including tendinitis, arthritis, sprains, muscle strain, spinal disorders and back pain. The benefit of Mesotherapy for treating pain is that patients no longer need to rely on high doses of daily pain pills which can eventually lead to liver and kidney damage. Mesotherapy involves the delivery of small amounts of FDA approved medications (non-cortisone, non-steroid) via local injections instead of ingesting or injecting intramuscularly or intravenously much larger dosages of medications, which are filtered in the liver and kidney and travel throughout one's body. This method of pain control also appears to be more cost-effective. The injections are virtually painless compared to trigger point injections or other therapy, for example some doctors use FDA-approved, non-cortisone, non-steroid, anti-inflammatory medications to treat pain. Mesotherapy, of course, is not a "be-all, end-all" solution. Patients also require physical therapy to rehabilitate and strengthen their muscles and joints.

Mesotherapy & Prolotherapy

Prolotherapy³

Prolotherapy is a treatment that stimulates the body to repair painful areas. The injections involve the use of substances that stimulate fibroblastic proliferation primarily at the junction of the bones, ligaments, and tendons. It is thus a periosteal (bone - ligament, bone - tendon junctions) injection. It is also given into joints to stimulate the repair of intraarticular structures, such as menisci and cartilage.

Mesotherapy & Sports Medicine

The main reason an athlete chooses to use mesotherapy, is the necessity for a fast and lasting effect on small problems of articulations, muscles and ligaments. In most cases, the aim of mesotherapy treatment is pain relief, muscle relaxation and decrease in inflammatory

response. The common objective of all these therapeutic modalities is reduced healing time, which enables the athlete to resume training, and competition with no increased risk. In practice indications for mesotherapy in sports medicine have been expanding regularly for the last ten years, primarily as a preferred therapeutic alternative to localized instillation of corticosteroids.

Mesotherapy for Osteoarthritis

Mesotherapy is indicated for osteoarthritis. Factors to consider before starting therapeutic management are as follows: Make the usual through physical, laboratory, and radiological assessment. Surgical cases should be referred immediately.

Proposed Medications used in Mesotherapy for Osteoarthritis

- Local anesthetics
- Muscle relaxants
- Non-steroid anti-inflammatory agents
- Calcitonin
- Highly polymerized DNA
- Indo-sulfur combinations
- B vitamins
- Chondroprotective agent
- Vasodilator drugs

Mesotherapy for Calcifications and Bone Spurs

Traditional medicine currently offers only one method to remove bone spurs: surgery. Bone spurs generally form as the body's response to stabilize a weak structure. Prolotherapy is therefore, successful because it strengthens weakened connective tissues, and relieves the pain of bone spurs.

Mesotherapy and Endotherapy (deeper injections with the same solutions) offer non-surgical alternatives to decreasing and eliminating the actual bone spurs, not just the pain of the bone spurs. By using compounds that affect calcium metabolism, such as EDTA,

a calcium chelator, and Calcitonin, a calcium hormone, these treatments can successfully remove bone spurs over a period of time. Athletes commonly experience calcifications in structures such as the biceps and rotator cuff tendons. Mesotherapy and Endotherapy are useful treatments to employ when these structures are painful. These treatments will, over time, help the body rid itself of the abnormal physiology that led to the calcifications, thus, reducing their size and negative effects.

Mesotherapy for Alopecia

Mesotherapy as an alopecia treatment has been proven effective for women with this frustrating condition. Androgenetic alopecia is a common condition causing the loss of hair in men or women. It is caused by the reduction in the number of normal, healthy hair follicles and their replacement by shorter, more brittle follicles that produce extremely fine hair that is prone to falling out. This process can be caused by poor circulation, poor nutritional habits and/or an excess of the hormone DHT. There is cause for hope for those who have the condition. With mesotherapy, alopecia can be reversed so that no more hair falls out while hair is encouraged to eventually grow back in⁶. The treatment could provide a welcome relief to the millions of alopecia sufferers worldwide that are not satisfied with the topical creams and medications.

Mesotherapy is a minimally invasive cosmetic procedure where a needle containing a customized formula is injected into the layer of fat beneath the skin. The formula contains a combination of pharmaceutical and homeopathic drugs, minerals, vitamins and amino acids in dosage levels decided according to the treatment in question.

Risks of Mesotherapy

Mesotherapy has caused no documented deaths, and there are no known serious risks of mesotherapy. In countries with less stringent medical guidelines mesotherapy has shown to have risks. Strict laws have eliminated the

possibility of such outcomes, and patients can expect only minor mesotherapy side effects, as described below.

Mesotherapy Side Effects

For patients who undergo Mesotherapy, side effects are minimal. Some patients who have a particularly low threshold for pain may be given a topical anesthetic prior to treatment, but most patients find the injections only mildly uncomfortable. Some patients feel a slight burning after the injection as the compound begins to dissolve fat, but this does not last long and is not common to all patients. Mesotherapy and scattered areas of numbness have also been linked; like other mesotherapy side effects, numbness will subside in a few days to a couple of weeks.

The most common mesotherapy side effects include bruising or swelling at the injection site and a slight itching lasting only a few hours after treatment. Temporary skin discoloration can also occur and will resolve on its own.

Mesotherapy and Bruising

The most common side effect of mesotherapy is bruising at the injection sites. Many doctors recommend topical creams or the supplement Arnica Montana to decrease mesotherapy bruising. Additionally, patients may be advised to wear loose clothing and avoid strenuous exercise for a day after their procedure to allow mesotherapy bruising to resolve. Since patients may not undergo another session until all bruising is healed, it is important that they follow their doctor's instructions on how to reduce mesotherapy bruising.

Mesotherapy and Swelling

Another one of mesotherapy's risks is slight swelling. This is common at the injection site, where small, painless bumps may appear. Swelling from mesotherapy is mild and will only last a day or two.

The FDA & Mesotherapy

Many of the drugs used in mesotherapy were not created especially for their mesotherapeutic purposes. For example, the commonly use drug

in mesotherapy injections, Aminophylline, was originally approved as a bronchodilator drug for those with several lung conditions, such as chronic bronchitis or emphysema. It is used in mesotherapy as it is proven to help improve blood flow in patients with respiratory problems and the hope is that it will do the same with those who have cellulite.

Phosphatidylcholine is one drug used in mesotherapy that the FDA actively lobbies against, because it is a drug that the FDA is able to regulate and is not approved by the administration for any sort of use.

Drugs Approved by FDA to be used in Mesotherapy^{4, 5, 7}

Procaine is another very popular drug used in mesotherapy. It is a local anesthetic also known as novocaine and is used to relieve the burning and itching sensations that sometimes come with mesotherapy injections. Other anesthetics used in mesotherapy include lidocaine and marcaine, both which are also FDA-approved.

Other compounds do not have FDA-approval for any sort of use, as they are not considered drugs and are thus beyond the scope of the FDA's regulation. This includes vitamins and minerals, such as those found in the local pharmacy. Mesotherapy practitioners often use liquid solutions of these compounds and inject them directly into the skin.

L-carnitine, a drug used in mesotherapy, is FDA-approved, not recommended for those who are pregnant or nursing; not advised for those with impaired kidneys. It is naturally present in the body as a fat-burning component of metabolism.

Biotin is actually a type of B vitamin sometimes called vitamin H or B7. It is a water-soluble nutrient and is essential for cell growth and metabolism of fats and amino acids. It is also sometimes used in Mesotherapy.

Minoxidil is another drug FDA-approved for topical use. This drug is actually the generic name for Rogaine used in treatment of Alopecia. It is part of a not too common method of mesotherapy that involves injecting minoxidil

into the scalp with a Skin & Scalp Roller (a medical instrument) to encourage hair growth.

Unlike many other drugs used in mesotherapy which are approved for oral consumption, retinoic acid has FDA-approval for topical treatment. It is widely used in beauty products because it has been proven to be an effective tool against numerous skin problems, from acne to wrinkles.

A similar compound, alpha lipoic acid is also approved for topical use; however the FDA has warned that it often leads to increased sensitivity of the skin to the sun.

Stability & Compatibility of Mesotherapy Injections

Sterility and freedom from particulate matter are common characteristics of all sterile dosage forms. They must also be pyrogen-free.

For these Mesotherapy injections, stability and compatibility become additional considerations, since the purpose of these compounded preparations is to provide a sterile solution or suspension of the medication, in the potency stated on the label that is safe.

Every compounding pharmacy must follow GMPs, SOPs, guidelines on documentation, preparation, quality control, quality assurance and more. Every batch and every injection must be tested. Potency and stability also needed to be evaluated.

New Trends and Recent Advances in Mesotherapy

Recent advances have eliminated the need for needles and offer No Needle Mesotherapy for the people with low tolerance for injections.

No Needle Mesotherapy⁸

No Needle Mesotherapy is a new technique without needles, pain or bruising. It utilizes Iontophoresis process to deliver the medications to the fat layer under the skin directly.

Iontophoresis is a non-invasive method well known for its use in transdermal drug delivery. The method utilizes a small electric field to

transport medicines across the skin into the fat layer.

Needle free Mesotherapy has the following benefits:

- Patients with a low pain threshold can now receive Mesotherapy.
- Patients can shorten time between treatments, enhancing the effectiveness.
- Larger areas can be treated.

Mesoglow^{8, 9}

It uses Iontophoresis to infuse vitamins and anti-oxidants into the mesoderm to stimulate collagen production, which reduces wrinkles leading to a smoother and younger looking skin. This procedure produces a facial glow, which is referred to as Mesoglow.

Mesoguns¹⁰

Mesogun will give the greatest advantage in the application of various Mesotherapy procedures including: Lipodissolve, MesoBotox, Bio-Rejuvenation, MesoLift, MesoSculpting, Alopecia/Hair Loss & Prolotherapy.

Some advantages of Mesotherapy guns include:

- Increased comfort level for patient and practitioner
- Reduced pain due to skin stabilizer, speed of needle and consistency of injections
- Elimination of operator wrist and hand fatigue
- Accuracy - Programmable and consistent - no room for operator error
- Versatility - accurately performs continuous, nappage, mesoperfusion & dosimetric modes
- Speed – Procedures are faster.

Safety & Future¹¹

Mesotherapy is simply an injection technique with the premise of injecting a medication. It is safe but it does not mean that every practitioner has equal skill. This is no different than in any other form of medicine. What makes

Mesotherapy different is the specific injection technique used for that particular patient and purpose with the injection technique ranging from the very superficial to deeper injections. Another difference is that non-mesotherapist practitioners think of giving only one injection for whatever treatment they are performing. So when treating tendinitis for example, they might give an NSAID injection for pain and inflammation followed by post operation medicines. Mesotherapists on other hand would give multiple smaller injections surrounding the flamed tendon usually forgoing oral medications. Although Mesotherapy treatment involves multiple injections, the total amount of medication actually given is much less than one large dose given by the traditional physician¹¹. There can be side effects as there are in any medical/surgical procedures. These in many cases can be minimized by thorough knowledge and good technique.

CONCLUSION

At this point in time, Mesotherapy is not something that one can learn in university programme so it is looked down upon. This is slowly changing as prominent physicians learn of Mesotherapy's benefits. This is important, as the benefits of Mesotherapy must be brought into the academic setting if it is to be accepted by medical community.

Whether Mesotherapy becomes part of Dermatology, Plastic Surgery, Internal Medicine, Physical Medicine residency programme, any or all of them? This will be decided over time as Mesotherapy proves itself and become respected.

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