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ABSTRACTS

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INTRODUCTION

On June 21, 2024, the First Multidisciplinary International Conference on Injectable Collagen Therapy was held at the National Institute of Geriatrics, Rheumatology and Rehabilitation (*Narodowy Instytut Geriatrii, Reumatologii i Rehabilitacji* – NIGRiR) in Warsaw, Poland. The conference was held under the patronage of NIGRiR and the Polish Rehabilitation Society. The meeting was attended by approximately 150 doctors from Poland and abroad (Italy, Jordan). Lectures were presented in three panels:

- pain medicine,
- wounds and scars,
- gynecology and aesthetic medicine.

Doctors of various specialties (orthopedists, rheumatologists, neurologists, surgeons, family doctors, medical rehabilitation doctors, internal medicine doctors, palliative medicine doctors, geriatricians, gynecologists, otolaryngologists, radiologists, dentists, aesthetic medicine doctors) shared their experiences in the use of injectable collagen therapy. This event demonstrated the wide application of injection collagen therapy, its effectiveness and safety.

Kamil Koszela
Chairman of the Scientific Committee

Fig. Lecture Hall of the National Institute of Geriatrics, Rheumatology and Rehabilitation in Warsaw – Conference report.

ABSTRACTS

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The beginnings of injectable collagen therapy in Poland

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Key words: collagen type I, tropocollagen, injection therapy

Mesotherapy is a minimally invasive medical technique involving multi-point microinjection of drugs, medical devices and other preparations administered by injection. The origins of mesotherapy date back to 1844. The first article on mesotherapy was published in 1958 by Michael Pistor. The first Polish publication on mesotherapy was published in 2018 by Brygida Kwiatkowska and Maria Maślińska. Injection collagen therapy has been used in the world for over 20 years, and in Poland for over 10 years. Injection collagen therapy is used in various pathologies of the musculoskeletal system, including the mesotherapy technique. It is mainly used for spinal pain syndrome and degenerative joint disease. The use of injection collagen therapy, its effectiveness and safety are confirmed by numerous studies, just like the mesotherapy technique.

Currently, in Poland, the technique of mesotherapy is in the program for specialization in rheumatology. This form of therapy is used by an increasing number of doctors in Poland, which is due to, among other things, its effectiveness and safety.

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Molecular bases of collagen-based compounds' action mechanisms

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Key words: fibroblast, collagen type I, mechanotransduction

In the field of functional tissue engineering collagen represents an interesting option when site-specifically injected since it acts as a bio-scaffold replacing, supporting, reinforcing, protecting connective tissues but also stimulating the neo-synthesis of collagen.

Given these characteristics, the use of injectable collagen for the clinical management of musculo-skeletal disorders due to overuse, aging, injuries can be recommended to:

- speed up of functional recovery timing,
- induction of repair, remodelling, and regeneration processes,
- secondary pain control.

The main action mechanism of injectable collagen is related to mechanotrasduction properties: Injections of tropocollagen improve tensile characteristics of the extracellular matrix which surround fibroblasts and improves fibroblasts' mechanical response speeding up the neosynthesis of collagen and inducing the proliferation of fibroblasts themselves. This mechanism of action has been studied and verified through studies, on *ex vivo* cellular models which provided data on the ability of swine type 1 tropocollagen to control tissue degeneration and improve the structural characteristics of the tissue.

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The use of collagen therapy in geriatric patients

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Key words: injectable collagen therapy, spinal mesotherapy, GTPS

Chronic pain is one of the most common symptoms in older adults. It is associated with physical disability, functional decline, falls, sleep and mood disorders, social isolation and increased demand for medical care. In the PolSenior2 study, chronic pain was reported by 47.6% of Poles aged 60 or over. According to this study, musculoskeletal related pain (especially low back pain – LBP) was the most common site of pain in geriatric population. Chronic pain affects the quality of life and requires medical treatment.

It is well known that pharmacotherapy of pain in elderly compared to younger adults is associated with a greater risk of adverse events. The risk of drug-drug and drug-disease interactions should be also taken into consideration. For example, nonsteroidal anti-inflammatory drugs (NSAIDs) are associated with the risk of renal, gastrointestinal and cardiovascular complications, while glucocorticosteroids may contribute to worsening blood pressure and hyperglycemia. Multimodal pain management is the solution to some of these problems. New therapeutic approach based on the use of tropocollagen injections may be an alternative or adjunctive treatment of arthro-myofascial pathologies.

Current research shows that tropocollagen injections may improve joint mobility, promote muscle distention, relieve localized pain or pain caused by joint movement or faulty posture. Spinal mesotherapy using collagen type I may be a safe and effective treatment method for chronic LBP in geriatric population. There is evidence of the effectiveness of collagen therapy in other musculoskeletal pathologies, such as gonarthrosis or greater trochanter pain syndrome (GTPS). In the elderly population, the choice of analgesic therapy should be made based on the risk-benefit balance. Collagen therapy is a promising and minimally invasive option.

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The role of injectable collagen therapy in palliative medicine

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Key words: injection therapy, musculoskeletal disorders, multimodal treatment

The cancer process accelerates the aging of cells, resulting in, among others, disorders in the protein system. Emerging collagen deficiency leads to damage to the connective tissue structures of fibrous skin, subcutaneous tissue, ligaments, tendons, fascia and muscles. Disturbances in the structural integrity and elasticity of the connective tissue contribute to an increase in pain sensation, a decrease in tension, the formation of wounds and ulcers.

The use of oral collagen in cancer patients is debatable. Collagen produced by cancer cells differs in structure from normal collagen and can affect the immune response of the body and affect the progression of cancer.

It has dual activity both inhibiting and promoting tumor progression at various stages of its development.

Regardless of stage, it is safe to use collagen by injection techniques. In the presented case tropocollagen was used in injections technique in a 77-year-old patient with massive keloids after surgical stabilization in the C5–Th2 section is presented. Root pain syndrome occurred with reduced mobility and increased muscle tone.

Palliative patients often experience degenerative pain with muscle overload, damage to the tendons and joints as a consequence of constant pressure. Injections of tropocollagen in the vicinity of overload changes accelerate the regeneration of extracellular matrix tissues (ECM) at the molecular level. Tropocollagen can be administered in the form of periarticular subcutaneous or fascial injections.

A beneficial effect is obtained when the collagen preparation is administered in the direct (if anatomically possible), proximity to the pain receptors (receptor sites), or acupuncture points. Collagen therapy may be the only form of therapy or component of multimodal treatment.

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Muscular dysfunctions of the masticatory system – tropocollagen and muscle tension

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Key words: injectable collagen therapy, temporomandibular disorders (TMD), alternative therapy

Masticatory muscle injections of liquid collagen solution is an alternative therapy for myofascial pain, often the first aid in pain ailments. Muscles of mastication: masseter muscle, temporal muscle and lateral pterygoid muscle are often painful in temporomandibular disorders (TMD) patients, especially bruxers. As the effect of muscle effort a PEMS (post effort muscle soreness) develops and if left untreated chronic myofascial pain may develop, with severe consequences for the temporomandibular joint (TMJ) and the whole stomatognathic system.

Injection therapy is, together with counseling and self-management, the first aid in muscle pain. It complements other therapeutic methods that should not be abandoned in TMD therapy. Intramuscular administration of collagen solution into the muscle trigger points reduces superficial electromyographic activity EMG, as well as subjective pain (Visual Analogue Scale – VAS) felt by the patient. After initial palpation of muscles and TMD examination, the injection should be performed by a specialist, paying special attention to anatomical structures and their mutual topography. Intramuscular injections, as well as perifascial and intraarticular administration of collagen solution are used to diminish pain in stomatognathic system.

Alternative therapy with collagen injections using new, innovative solutions seems to be a new trend in the development of medicine around the world. No side effects, easy availability of the preparation and fully reversible action are the great advantages of intramuscular collagen injections.

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Injection collagen therapy in tension headaches

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Key words: myofascial pain syndrome (MPS), headache, collagen type I

The masticatory muscles form a functional and developmental group innervated by the third branch of the trigeminal nerve, making their contraction influenced by emotions. Pain sensations transmitted within the trigeminal nerve's innervation area can lead to diagnostic errors in differentiating headaches. Psychological tension is the main cause of bruxism, and increased muscle tension results from stress.

The masticatory muscles include the masseter, temporal, and upper lateral pterygoid muscles. The sternocleidomastoid muscle also plays a significant role in headaches associated with masticatory system dysfunctions.

Collagen injections serve as a biologically active scaffold, inducing repair and promoting new tissue formation. Tropocollagen supports and protects tissues. Accurate diagnosis is crucial because tropocollagen injections work locally. Myofascial pain from overload or injury responds to these injections. For referred pain, identifying its source is necessary, as injecting the perceived pain site may not be effective.

Tropocollagen injections balance degradation and regeneration, restoring structural integrity, elasticity, and tissue strength. They stimulate fibroblast migration and proliferation, increasing type I collagen synthesis and other connective tissue factors.

Studies show that intramuscular collagen injections reduce myofascial pain in the masseter muscles more effectively than lidocaine, decreasing muscle activity and pain intensity. Collagen supports regeneration, reduces cell death, increases cell proliferation, and aids in nerve myelination. After muscle injuries, increased collagen production confirms its role in regeneration.

Tropocollagen injections appear to be a promising support in treating tension headaches of masticatory origin. Headaches require meticulous diagnosis, but for tension headaches, tropocollagen may prove to be an effective solution.

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The role of injection collagen therapy in the course of rheumatic diseases

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Key words: collagen injection, inflammatory rheumatic diseases, pain

The main two aims collagene therapy in rheumatology are supporting pain treatment in inflammatory diseases and element of multimodality of pain treatment in non-inflammatory diseases.

In inflammatory rheumatic diseases can coexist the different type of pain such as nociceptive pain, neuropathic pain, nociplastic pain as well as inflammatory pain. This last pain ententity resulting from the activity of the inflammatory process, and special inflammatory environment i.e. pro-inflammatory cytokines, especially interleukin-6 (IL-6), tumor necrosis factor (TNF), IL-1 or chemokines, can be seen as a possible combination of other types of pain. Inflammatory processes can be involved in previously mentioned types of pain as a combination of the previously mentioned types (Table I) [1].

Residual pain results from chronic pain initiated by the inflammatory process, e.g. in rheumatoid arthritis (RA), but remains because it results from other mechanisms/causes, such as: a fibromyalgia component, low mood/depression, damage that is no longer amenable to anti-inflammatory therapy. In such case, the necessary and supportive treatment should be analyzed in detail.

Currently in RA is presented the concept of dual role of collagen which may imply an approach to collagen therapy. A controversial finding of collagen and arthritis hypothesis was reported: intravenous injection of CII could potentially suppress a collagen induced arthritis (CIA) model by increasing a crucial anti-inflammatory mediator of CIA, IL-4 [2]. The antiarthritic mechanism of collagen and its peptides has been suggested. Collagens of different molecular weights are absorbed in the large intestine and transported to arthritic joints via the circulation as tripeptides to treat arthritis. It was assumed that the administration of collagen by various routes (intra-articular injections, intra-tendon local injections, intra-muscular injections, peri-articular injections, mesotherapy) may have an impact on pain relief, stimulation of healing, the use of glucocorticosteroids (reduction or even elimination) and remove factors generating pain beyond the inflammation resulting from inflammatory rheumatic disease [3]. In one study polymerized-collagen increased the time to total knee arthroplasty by at least 60 months, modifying the disease course, improving functional disability, and decreasing pain [4]. Another revealed that collagen injection can induce in tenocytes an anabolic phenotype by stimulating tenocyte proliferation and migration and collagen type I synthesis, maturation, and secretion, thus favoring tendon repair. In particular, based on its effect on gluteal tenocytes, collagen could be effective in the discouraging treatment of greater trochanteric pain syndrome. Collagen acting as a mechanical scaffold, could be an effective medical device used as a novel therapeutic, regenerative and rehabilitative approach to favor tendon healing in tendinopathies [5].

The study by Nitecka-Buchta et al. [6] confirmed that intramuscular injection of collagen is a more efficient method for reducing myofascial pain within masseter muscles than intramuscular injection of lidocaine. The usefulness of mesotherapy was touched upon in other abstracts. To summarized available studies the collagen

Table I. Factors that need to be taken into account in the analysis of pain, i.e. causes, type, time and effects

Cause	Type	Duration	Effects
Inflammation Damage/deformation Overload Functional impairment Abnormal movement patterns	Nociceptive Neuropathic Nociplastic	Acute < 12 weeks Chronic > 12 weeks	Increasing scoring in disease activity assessment (e.g. DAS, DAS28), despite of decrease of inflammatory markers or/and joint involvement Functional impairment Glucocorticosteroids use Abnormal movement patterns

DAS – Disease Activity Score.

injection therapy in rheumatic diseases is of particular importance in the treatment of diseases without significant systemic inflammation, such as degenerative disease (e. g. osteoarthritis).

Administration/injection methods may be different depending on the problem: damage, local inflammation, pain syndrome. There are also positive data in the case of the use of collagen therapy in inflammatory diseases accompanied by other causes of pain, damage, residual pain, pain in periarticular tissues. Also the effectiveness of collagen therapy in the treatment of tendinopathy and myofascial pain has been demonstrated.

In conclusion such therapy may be a complementary method in the treatment of rheumatic diseases and may also delay surgical interventions in osteoarthritis.

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Synergy of specialized medical training and regenerative medicine treatments: how to strengthen and optimize the natural healing processes of sports injuries

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Key words: injectable collagen therapy, musculoskeletal disorders, regenerative medicine

Tissue injuries initiate specific healing processes, which are sequentially: inflammatory, regenerative, and tissue remodeling, and these are time-consuming. Additionally, the natural response to injury is reduced physical activity, which in turn weakens anabolic signaling, disrupting mechanotransduction mechanisms. Through appropriate therapeutic intervention, we can modulate these processes, accelerating and simultaneously optimizing the healing process without risking re-injury.

One solution to avoid stagnation in training is the use of occlusion exercises. By controlled introduction of the injured tissue to stress, using low loads with partially restricted arterial blood flow and complete venous outflow occlusion, we allow the influx of pro-inflammatory factors without further damaging the tissue structure. This accelerates and stimulates the body's natural healing and repair cycles, such as lactate accumulation, pH increase, and enhanced anabolic signaling, which triggers growth and remodeling.

Such an intensified process requires collagen supplementation, providing the essential building material for faster and safer regeneration of injuries. Collagen presence supports the reconstruction of tissue structure, which is crucial for restoring full functionality post-injury.

Thanks to modern diagnostic ultrasound methods, it is possible to inject collagen directly into the injured tissue structures and monitor the structure itself and the ongoing remodeling processes. Combining such therapy with a well-planned rehabilitation training program allows for a quicker return to full fitness and reduces the risk of re-injury. This has been demonstrated through clinical examples illustrating the effectiveness of this training and sports therapy synergy in practice.

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The role of injectable collagen therapy in the three-stage treatment concept

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Key words: risk factors, medical therapy, rehabilitation

Injection collagen therapy is a new therapeutic tool in medicine. Various injection techniques are used, from mesotherapy (local intradermal therapy – LIT), intramuscular injections to intra-articular injections. Based on the conducted researches, this method seems to be effective and safe. This therapy is used in pathologies of the musculoskeletal system (degenerative disease, enthesopathies, tendinopathies and others). In addition, collagen injection therapy is used in spinal pathologies, especially those of a myofascial pain syndrome (MPS). However, as a tool alone it may not be sufficient. Therefore, in relation to the three-stage treatment concept it may prove to be more effective. The three-stage concept of treating pathologies of the musculoskeletal system consists of:

- assessment of risk factors, their reduction and/or modification,
- implementation of targeted medical therapy, in this case collagen injection therapy, and then
- implementation of targeted rehabilitation at the appropriate time.

Injection collagen therapy activates repair mechanisms. It restores the correct tension in the soft tissues (muscles, fascia, ligaments), which are often subject to increased tension in the course of various pathologies of the musculoskeletal system. As a result, mobility improves and pain is reduced. Based on clinical experience to date, this regimen provides satisfactory results. However, further researches are required.

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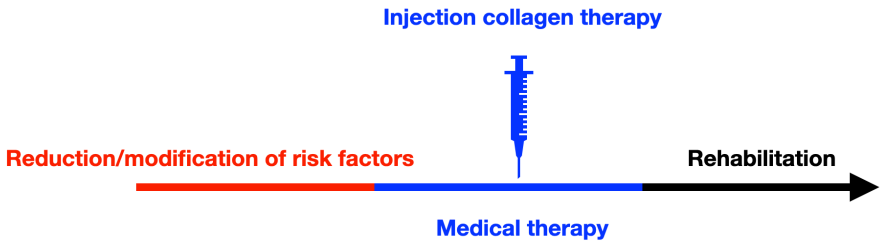

Fig. 1. Three-stage treatment concept diagram.

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The role of rehabilitation after spinal collagen mesotherapy in the tree-stage treatment concept

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Key words: spinal mesotherapy, physiotherapy, conservative treatment

Sedentary lifestyles, work overload and lack of regular physical activity are risk factors for spinal pain syndrome. In daily medical practice, non-neurogenic spinal pain syndromes are often diagnosed, among them, myofascial or vertebrogenic pain. This problem affects a large group of patients and reaches about 70–80% of spinal pain cases.

One treatment method that is safe and has no side effects is spinal mesotherapy. This method involves making multi-point intradermal microinjections with the administration of drugs or medical devices. As a result, the conditions are created for the necessary process, which is rehabilitation in the broadest sense. The basis for the inclusion of physiotherapy is the patient's general condition, the performance of examinations and functional tests, sensory testing, especially deep sensory testing, and pain sensory testing.

Movement therapy, as well as physical treatments and the use of special methods are extremely important in spinal pain syndrome, is performed when the pain is less severe, after the patient's mobility has improved. The purpose of this presentation is to evaluate the role of rehabilitation of patients after spinal mesotherapy in terms of the three-stage treatment concept for spinal pathology (Fig. 1).

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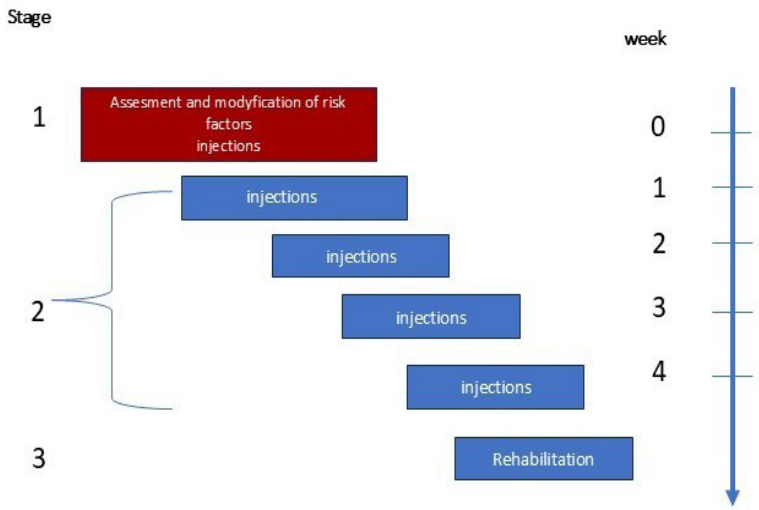

Fig. 1. Three-stage treatment concept diagram.

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Injection collagen therapy in combination with other therapies – how and why?

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Key words: hyaluronic acid therapy, platelet rich plasma (PRP), steroid injection

Injection collagen therapy is very often used as monotherapy in the course of various pathologies, including pathologies of the musculoskeletal system. In the treatment of musculoskeletal system pathologies, the following are also used: glucocorticosteroid (GC) therapy and platelet rich plasma (PRP) applied intra-articularly and peri-articularly, as well as hyaluronic acid therapy, mainly applied intra-articularly. The use of injectable collagen therapy is two-way:

- GC or PRP or hyaluronic acid are administered intra-articularly, and collagen therapy is used peri-articularly, i.e. different products in different areas, and
- GC and collagen or PRP and collagen, hyaluronic acid and collagen are used, e.g. intra-articularly, i.e. different products in one area.

Such injection regimens are often used in medical practice. It should be remembered that GC therapy is associated with side effects, especially in the group of geriatric patients with hypertension and diabetes. This allows for the use of lower doses of GCs in combination with injectable collagen with good therapeutic effect, especially in patients at risk.

There are more and more studies in the literature showing the efficacy and safety of injectable collagen therapy used alone or in combination with other preparations. However, this topic requires further prospective and observational studies.

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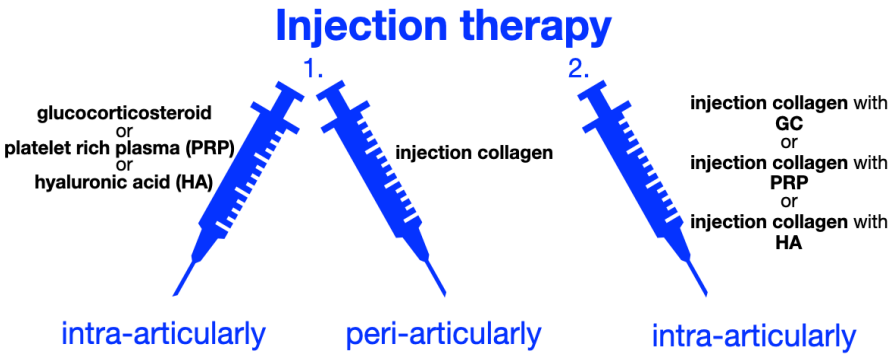

Fig. 1. Different injection methods in musculoskeletal pathologies.
GC – glucocotricosteroid, HA – hyaluronic acid, PRP – platelet-rich plasma.

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Do we need a guideline in mesotherapy?

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Key words: local intradermal therapy (LIT), injection therapy, minimal invasive therapy

For many years mesotherapy has been interpreted as a valid therapy for all pathologies. Many doctors have learned mesotherapy passed down by word of mouth from one doctor to another. No one has ever examined the available data to define mesotherapy or delimit its advantages and limitations. This has also caused the suspension of mesotherapy in some countries for some aesthetic reasons. In other countries it has been interpreted as an ineffective technique.

The Italian Society of Mesotherapy created a scientific development plan to demonstrate the advantages and limitations of the mesotherapy technique. Clinical studies and reviews of available data have made it possible to understand the mechanism of action and areas of application. Over the decades, indications without scientific basis have been eliminated by the Italian Society of Mesotherapy and we have concentrated on pathologies with greater efficacy and safety.

Thanks to the scientific data, an international review process has begun to share the role of mesotherapy, its advantages, limitations and correct use in clinical practice with multidisciplinary experts from various countries around the world. Thirty recommendations were made that all experts approved and mesotherapy was redefined as a minimally invasive technique that consists of the introduction of small quantities of pharmaceutical substances with microdeposits into the superficial layer of the skin. Injected compounds diffuse slowly into underlying tissues and produce a drug-sparing effect compared to the parenteral route. Used correctly, this technique can be useful in some clinical indications.

Mesotherapy, known as intradermal therapy, has therefore become a technique used to inject a drug into the superficial layer of the skin which is now widespread throughout the world. Mesotherapy is successfully applied in the treatment of some forms of localized pain syndromes and other clinical conditions and can be suggested when a systemic drug-sparing effect is considered useful, when other therapies have failed (or cannot be used) and when mesotherapy can synergize with other pharmacological or non-pharmacological therapies. More studies are needed to understand the effectiveness of some compounds compared to others but if applied after a correct diagnosis and with the patient's consent, mesotherapy is an effective therapeutic weapon. The Italian Society of Mesotherapy is now producing the first international guideline that will allow all countries to have an update and information to include mesotherapy in the care pathways of patients.

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Interventional radiology of the knee joint and surrounding tissue based on hybrid magnetic resonance imaging, computed tomography and ultrasound imaging

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Key words: musculoskeletal disorders, intra-articular injections, minimal invasive therapy

The knee is very often an area subjected to ultrasound-guided interventional procedures, computed tomography (CT) or magnetic resonance imaging (MRI). The presentation discussed the following interventional treatments: ultrasound, CT and MRI control specific to the knee joint area. The knee joint itself often sustains injury during sport activities and requires intervention image control. Injuries to the knee can include: soft tissue and structural damage, both to the anterior compartment and the femoro-tibial joint, or to the area around the joint itself.

The presentation details specific technical issues, such as diagnostic and therapeutic aspects related to soft tissue interventions around the iliotibial band, intra-articular fat bodies, tendinous structures, the patella, bursae, and menisci.

The most common knee joint interventional procedures include: aspiration, drug administration, performing a biopsy, as well as radiofrequency ablation (RFA) therapy in selected cases.

For these cases diagnostic arthrography in the scope of CT and MRI, single- and double-contrast were used.

Additionally, the presentation discussed the latest available treatment methods using ablation and RFA cryoablation, which is the most common technique used in the treatment of lesions around the knee joint, as well as the periarticular area.

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Hard to heal lower limb ulcers in surgical practice

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Key words: collagen type I, injectable collagen therapy, chronic wounds

Chronic lower limb ulcers are hard to heal in personal, social and financial aspect. There are three general types of lower limb ulcers: diabetic foot, venous ulcers and pressure ulcers. All of them require sophisticated dressings and therapies to achieve healing. Collagen injection therapy is one of these measures.

Collagen presents a variety of biochemical and physical properties important for each phase of wound healing.

We present three cases of diabetic foot ulcers supported with collagen injection therapy.

A young patient with thrombophilia presented with diabetic foot ulcer under great toe. He slowly healed on iodine dressings. We opted for activated plateted rich fibrin dressing applied only once and collagen injection therapy every fourteen days. His ulcer healed in twelve weeks.

Our second patient presented with Charcot foot and an ulcer under left medial malleolus area. After a course of negative wound pressure therapy, the ulcer was ready for closure but there were not enough healthy tissues to perform this. Collagen injection therapy was introduced weekly along with dressings. Wound closure was achieved in 6 months since the first presentation.

The third patient presented with necrotic ulcer over lateral aspect of fifth metatarsal head. Healing of the wound was impaired due to his late stage of renal insufficiency and advanced neuropathy. We decided to support his standard therapy with weekly courses of collagen injections until full wound closure 4 months after the first presentation.

In conclusion: collagen injection therapy plays an important supportive role in lower limb ulcers treatment.

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Collagen versus scars and other skin defects

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Key words: aesthetic medicine, injectable collagen therapy, anti-aging

Hypertrophic scars, keloids and minor skin defects are frequent chief complaints in the practice of an aesthetic medicine doctor. The currently available medical literature lists various widely accepted management strategies against them, including, among others, surgery, laser therapy, cryotherapy, radiotherapy, and physical methods. These vary in their indications, contraindications, adverse effects and success rates – therefore, these modalities need to be tailored to each patient individually.

In recent years, collagen-based injections have garnered interest in the treatment of the above-mentioned conditions thanks to their favorable safety profiles, ease of use and observed effectiveness in improving patients' satisfaction with their bodies. Despite the paucity of scientific data regarding their clinical impact, injections of collagen-based solutions have become a viable choice in the treatment of various skin defects, yielding promising results.

We present a series of 10 cases of successful collagen injection therapies in patients presenting to the Lift-Med Clinic in Rybnik, Poland, due to scars, keloids and/or minor skin defects. In all patients, a clinically significant reduction in the severity of the primary condition has been achieved.

The effects appreciated in the patients included in this presentation exemplify the potential benefits of using collagen-based product injections in the treatment of scar-adjacent and other skin lesions. As of now, this modality of treatment awaits further studies elucidating the exact indications and contraindications for its application. presenting to the Lift-Med Clinic in Rybnik, Poland, due to scars, keloids and/or minor skin defects.

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The use of tropocollagen in aesthetic medicine

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Key words: injectable collagen therapy, anti-aging, regeneration

The modern conception of the aging process is that it occurs in all tissues of the face, neck, and décolleté, and is connected with the gradual loss of collagen and reduced regenerative capacity. Changes in the innermost facial muscles include an increase in muscle tone, muscle mass, functional tension leading to wrinkle lines and dermo-muscular folds. Elongation of the muscle bellies leads to a lowering of the brow line or the occurrence of loose skin folds in the jawline and neck area. There is also a functional predominance of lowering muscles with age, making the face look sad and tired. Changes in the skin mainly affect collagen – reduction of synthesis, increased degradation processes, and a slowdown in fibroblast cell division.

The facial ligaments play a very important role in the aging process, which supports the three-dimensional structure of the soft tissues and skin of the face and maintains tension between the skin and the tissues lying deeper, thus firming and stabilizing the entire complex. The answer to progressive age-related changes is collagen injections, dedicated to specific tissues of the face, neck, and décolleté area, administered at the appropriate depth. The MD-MUSCLE administered to all mimic muscles regenerates the muscle structure and relaxes it, providing the basis for treatments for the skin. In skin treatments, MD-TISSUE injections are used, in intradermal punctures, to improve tissue density and thus improve firmness and appearance. Additionally, in areas of the true and pseudo facial ligaments, MD-TISSUE injections are deepened to support their structure and elasticity.

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Tropocollagen in the regeneration of oral soft tissues – the latest reports

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Key words: injectable collagen therapy, regenerative medicine, minimal invasive therapy

The aim of this study is the clinical observation of gingival tissue condition after tropocollagen injections in orthodontic patients treated with clear aligners (Invisalign). The porcine origin collagen type I (MD-TISSUE, 2 ml amp; Guna Medical Device) was injected into keratinized gingivae four times at 7–14 days intervals for mild gingival papillary recession, thin biotype of gingivae and teeth hypersensitivity associated with gingival recession. The purpose of the treatment was to prevent detrimental effect on the periodontium, especially on the patients with thin biotype and to cure periodontal complications induced by orthodontic treatment.

Teeth hypersensitivity decreased from 7 to 2 on the Visual Analogue Scale (VAS). After four sessions with tropocollagen, significant improvement was observed in gum recession, the number of gingival papilla defects and gingival thickness.

It is reasonable to conclude that tropocollagen increases the safety of oral connective tissues during the treatment of patients with clear aligners and significantly reduces teeth hypersensitivity. The injectable form of tropocollagen is a promising material for gingival soft tissue regeneration and periodontal tissue biotype, including the thickness of gingivae and gingival papillae regeneration

Future research on tropocollagen will focus on improving the technology of its use and understanding the interaction with other factors influencing the process of soft tissue reconstruction, e.g. with platelet-rich fibrin (PRF) for I-PRF injection.

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S-018 DOI: https://doi.org/10.5114/reum/202172

Collagen injections in otorhinolaryngology

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Key words: injectable collagen therapy, collagen type I, regeneration

Collagen is a natural material used in many areas od medicine. New applications of collagen in various medical specialties are more and more common. Use of collagen in otorhinolaryngology is a common practice in some indications, in others is still a matter of experiments.

Collagen is used in otorhinolaryngology for aesthetic effects. Patients after head and neck operations, mainly for oncological reasons (laryngectomy, neck lymphadenectomy), get collagen for scar smoothing and other corrective procedures. Trauma related scars (accidents, burns, radiotherapy) can be corrected with collagen. Skin defects of the nose after tumor excisions, like basal cell carcinoma, can be filled with collagen, to improve the aesthetic effect and patient`s quality of life. Similarly, collagen may be used to fill in nasal septum defects, mainly after trauma or overuse of decongestive nasal drops.

Otolaryngologists and dental surgeons use collagen to fill tissue deficits and lift maxillary sinus bottom in cases of alveolar perforations penetrating maxillary sinuses. The procedure is very effective in closing the gaps and limiting the inflammation process, leading to faster recovery.

In patients suffering from dysphonia due to vocal folds damages (vocal abuse, radiotherapy, chronic inflammations, post intubation trauma) collagen is used to fill tissue defects. The volume of the tissue increases which improves phonation and leads to better voice quality.

Some experimental collagen applications are still subjects of research. Collagen used to build a scaffolding for regenerating a respiratory ciliary epithelium, sealing the upper wall of tympanic cavity or treatment of trigeminal or facial neuralgia, are the examples.

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Collagen injectables for urinary incontinence

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Key words: injectable collagen therapy, minimal invasive therapy, tropocollagen

Urogynecological diseases, including pelvic organ prolapse (POP) and urinary incontinence (UI), significantly affect the quality of women's life. The POP affects more than half of women over 50 years of age. The risk of UI depends on mechanisms resulting from three streams: ageing of the body, number of pregnancies and deliveries, as well as obesity. These are also possible points of potential interventions for prevention and treatment of urinary incontinence. Pregnancy affects the biomechanical properties of pelvic soft tissues. In addition, the loss of collagen in the ageing process is a natural process and collagen degradation is not compensated for by sufficient synthesis. Providing this protein from the outside may therefore slow down the degradation processes.

Assuming that tropocollagen I mesotherapy may be an alternative to surgical treatment of urinary incontinence, a pilot study was conducted in a group of 5 women with confirmed urinary incontinence. MD-Matrix and MD-Muscle collagens from Guna were used in the form of periurethral, transvaginal and suprapubic subcutaneous injections – mesotherapy. Four series of treatments were performed at 14–21 day intervals, using the preparations alternately, starting with MD-Matrix. According to the latest reports, improving the structure of the pelvic floor tissues may be a key strategy for the treatment of UI.

The preliminary results indicate that injectable tropocollagen may be effective in reducing the severity of urinary incontinence, and thus in improving the quality of life in women with already diagnosed UI, both in menopausal transition and after menopause.

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S-020 DOI: https://doi.org/10.5114/reum/202174

Vaginal carbon dioxide laser therapy and tropocollagen injections – combination therapy of the genitourinary syndrome of menopause

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Key words: injectable collagen therapy, minimal invasive therapy, collagen type I

The genitourinary syndrome of menopause (GSM) affects 50–70% of postmenopausal women, necessitating effective treatments. Declining estrogen levels during menopause lead to significant changes in the genitourinary system, including vaginal atrophy.

Vaginal carbon dioxide laser (CO_2) laser therapy involves the application of laser energy to the vaginal mucosa, creating controlled micro-injuries. This stimulates the production of new collagen and elastin fibers. The therapy results in the thickening and tightening of the vaginal epithelium, restoring its elasticity and moisture, consequently treating symptoms of GSM. Patients typically undergo a series of treatments, spaced several weeks apart, to achieve optimal results. The benefits include improved vaginal health, enhanced sexual function, and a reduction in urinary incontinence symptoms.

Vaginal collagen injections are a complementary treatment that involves injecting collagen directly into the vaginal tissue. This minimally invasive procedure aims to provide immediate support and structure to the vaginal walls. Collagen is a vital protein that contributes to the strength and elasticity of connective tissues. By injecting collagen, the treatment can enhance vaginal tightness, improve moisture levels, and provide relief from symptoms of GSM. The procedure is usually quick, with minimal downtime, allowing patients to resume their daily activities shortly after treatment.

Combining vaginal CO_2 laser therapy with collagen injections offers a synergistic approach, enhancing the overall effectiveness of treatment. While the CO_2 laser stimulates long-term collagen production and tissue remodeling, the collagen injections provide immediate structural support and symptom relief. This combination can significantly improve the quality of life for women suffering from GSM and related conditions.

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