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II INTERDISCIPLINARY INTERNATIONAL CONFERENCE ON INJECTABLE COLLAGEN THERAPY

April 11-12 2025, Warsaw, Poland

ABSTRACTS BOOK

Patronage of Committee of Rehabilitation, Physical Education and Social Integration of the Polish Academy of Sciences

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The papers have been qualified by the Scientific Committee of the Conference

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Marta Woldańska-Okońska

On April 11-12, 2025, the Second Multidisciplinary International Conference on Injectable Collagen Therapy was held in Warsaw, Poland.

The conference was held under the patronage of National Institute of Geriatrics, Rheumatology and Rehabilitation in Warsaw, the Polish Rehabilitation Society and the Polish Association of Temporomandibular Disorders. The meeting was attended by approximately

200 doctors from Poland and abroad (Italy, Jordan, Switzerland, UK).

Lectures were presented in five panels:

- pain medicine,
- wounds and scars,
- gynecology and aesthetic medicine.
- rehabilitation.
- case study.

Doctors of various specialties (orthopedists, rheumatologists, neurologists, surgeons, family doctors, medical rehabilitation doctors, internal medicine doctors, geriatricians, gynecologists, otolaryngologists, radiologists, dentists, and 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

Fot. Archive

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BIOLOGICAL CHARACTERISTICS OF COLLAGEN AND EFFECTS OF COLLAGEN MEDICAL DEVICES ON MUSCULOSKELETAL SYSTEM

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ABSTRACT

Collagen (28 different types) is the most expressed protein in mammals. Type 1 collagen is the predominant one in non-cartilaginous tissues, even though present in cartilage tissues too (such as menisci, TMJ, intervertebral discs). Type I collagen is also a primary component in the outer layers of the spinal disc (annulus fibrosus), providing tensile strength to resist compressive loads. Tropocollagen, which is a supercoil made up of 3 helices (linked through H-bonds) is the collagen fundamental subunit. Each helix (left-handed) contains about 1.000 amino acids (Gly, Pro, Hyp are the most represented ones). In the field of Functional Tissue Engineering collagen represents a treatment option when site-specifically injected since it acts as a bio-scaffold.

Collagen timing of injection (A) and collagen concentration (B) are two key parameters for planning a successful therapy.

(A) After an injury, fibroblast's proliferation reaches the peak between 12 and 28 days; contextually, tissue tensile strength properties naturally increase after 45 days. This timing is linked with collagen deposition mechanisms and, therefore, with repair and remodeling processes. Collagen injective treatment speed up this process anticipating tensile strength peak at day 28 after injury. Acting as a bioscaffold, injected collagen speeds up the fibroblast's activation, inducing a faster endogenous neo-collagen deposition.

(B) About collagen concentration, *in vitro* studies identified the most effective collagen concentration as 100 µg/ml, in line with Collagen Injectable Medical Devices line we refer to (collagen content 100 µg/2ml vial). Swine collagen was chosen for its high similarity with the human one and its very low immunological cross-reactivity.

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 functional recovery timing inducing tissue repair, remodeling, and regeneration; swine Type 1 collagen injections control tissue degeneration and improve the structural characteristics of the tissue mainly through I) an increase of cell proliferation; II) an increase of collagen synthesis; III) a control on collagen turnover; IV) an improvement of wound healing processes.

KEYWORDS: collagen, tropocollagen, helices, injectable collagen

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MESOTHERAPY IN THE RHEUMATOLOGY SPECIALIZATION PROGRAM IN POLAND

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ABSTRACT

Mesotherapy (LIT – Local Intradermal Therapy) is a minimally invasive medical procedure used by doctors around the world for various pathologies, especially in musculoskeletal disorders. Mesotherapy involves multi-point microinjection with the administration of a drug/medical device deposit, either in combination or separately. Standard medications include NSAIDs, anesthetics such as lignocaine, and injectable type I collagen. The main goal of mesotherapy is to restore physiological local circulation, relax tense soft tissues (muscles, fascia, ligaments) and consequently, reduce pain. Mesotherapy is used especially in spinal pathologies, including spondyloarthropathies. Minimally invasive procedures with a low risk of side effects are increasingly being used in rheumatology practice. One such method is mesotherapy. This procedure has been introduced into the rheumatology specialization program in Poland. Young doctors are trained during specialization courses titled „Pain in Rheumatic Diseases." This is a new, different approach to the issue of pain treatment in rheumatic pathologies.

KEYWORDS: local intradermal therapy, minimal invasive therapy, pain, spondyloarthropathy

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PRELIMINARY EVALUATION OF THE IMPACT OF COLLAGEN INJECTIONS ON THE TREATMENT OF SCOLIOSIS

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ABSTRACT

One of the essential functions of fascial structures is to maintain the integrity of the human body while preserving its strength and flexibility. The colloidal nature of fascial tissues, combined with the presence of collagen fibers, enables rapid adaptation to biomechanical changes. The myofascial structures of the lumbar spine play a critical role in maintaining pelvic alignment and symmetry hence its important role in etiopathogenesis of scoliosis. Asymmetry in the tension of these structures can lead to lateral curvature of the lumbar spine, contributing to scoliosis progression. Conservative treatment of idiopathic scoliosis presents a significant therapeutic challenge, partly due to adhesive changes within the myofascial structures on the concave side of the spinal curvature. The study aimed to evaluate the impact of ultrasound-guided tropocollagen injections into the adhered layers of deep fascia on the concave side of the lumbar spine curvature on the effectiveness of manual therapy treatment in scoliosis correction. This study included 8 female participants aged 12-17 diagnosed with right thoracic and left lumbar scoliosis. The participants were divided into two groups: Study group (4 patients): Received one-week manual therapy treatment preceded by tropocollagen injections into adhesive fascial structures in order to separate them. Control group (4 patients): Received one-week manual therapy treatment only. All participants underwent 60-minute physiotherapy sessions three times a week. The therapy included Muscle Energy Techniques (MET) and Proprioceptive Neuromuscular Facilitation (PNF) exercises targeting stretching myofascial structures on the concave side of the curvature. The range of lateral bending tests were assessed before and after the first session and three weeks later. A longer correction effect was observed in people who underwent tropocollagen injections. Tropocollagen injection therapies appear to enhance the outcomes of corrective exercises for scoliosis treatment. Incorporating these injections into routine clinical practice improves therapeutic results by stimulating the repair processes of damaged connective tissue and positively influencing the organization and integrity of collagen fibers. Further research is necessary to fully understand the mechanisms of tropocollagen's effects on altered connective tissue in scoliosis and to optimize therapeutic protocols.

KEYWORDS: scoliosis correction, collagen injection, fascia

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THE USE OF DIAGNOSTIC IMAGING AND RADIOLOGY IN THE ASSESSMENT OF COMPLICATIONS IN MEDICINE AND PLASTIC SURGERY

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ABSTRACT

Modern imaging techniques play a key role in the assessment of complications following aesthetic medicine and plastic surgery procedures. Imaging tests enable the precise identification, characterization and monitoring of a wide range of complications, both early and late. Magnetic resonance imaging (MRI) is particularly valuable in the assessment of breast implants, enabling the detection of ruptures, displacements and the formation of fibrous capsules. Computed tomography (CT) is used in the assessment of complications after facial and skull reconstruction, allowing three-dimensional visualization of bone structures and soft tissues. Ultrasonography, thanks to its availability and non-invasiveness, is the method of choice in the diagnosis of complications after tissue filler injections, enabling the identification of granulomas, asymmetry, and abnormal distribution of material.

Conventional radiological examinations, although limited in their sensitivity in assessing soft tissues, remain important in detecting the presence of foreign bodies and bone complications. Innovative imaging techniques, such as elastography and MR spectroscopy, increase the ability to differentiate between inflammatory and neoplastic lesions. Early detection of complications using imaging methods allows for rapid intervention, minimizing the risk of permanent aesthetic and functional defects.

Cooperation between radiologists and plastic surgeons is essential for the optimal interpretation of imaging results in a clinical context. Standardization of diagnostic protocols and the development of dedicated diagnostic algorithms significantly improve the effectiveness of the therapeutic process and the safety of patients undergoing aesthetic medicine and plastic surgery procedures.

KEYWORDS: medical imaging, radiology, aesthetic medicine, surgical complications, patient safety

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INTRAMUSCULAR COLLAGEN INJECTIONS AS AN ALTERNATIVE IN THE TREATMENT OF MYOFASCIAL PAIN IN TEMPOROMANDIBULAR DISORDERS – A NEW THERAPEUTIC METHOD

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ABSTRACT

Masticatory muscles 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, PEMS (Post Effort Muscle Soreness) develops and if left untreated a chronic myofascial pain may evolve, with severe consequences for 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, like splint therapy, psychotherapy, physiotherapy and pharmacotherapy. 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 solutions are used to diminish pain in stomatognathic system. Alternative therapy with collagen injections as a new, innovative solution seems to be a promising trend in the development of alternative medicine around the world. No side effects, easy availability of the preparation and fully reversible action are the great advantages of intramuscular collagen injections.

KEYWORDS: muscle pain, intramuscular injection, myalgia, collagen injections, pain management, alternative pain therapies

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MESOTHERAPY GUIDELINES IN MUSCULOSKELETAL DISORDERS

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ABSTRACT

Mesotherapy is a technique involving micro-injections of pharmacological substances into the dermis, allowing gradual diffusion and prolonged therapeutic effects. Despite its extensive use worldwide, its application has often been inconsistent, lacking standardized guidelines and sometimes resulting in inappropriate drug use or adverse events.

A structured consensus process was carried out to clarify the rationale, technical standards, and clinical indications for this approach. Evidence from the scientific literature was reviewed, and a large group of experts from multiple medical fields – including pain management, dermatology, rehabilitation, anesthesiology, and primary care – evaluated and voted on key clinical and ethical questions. Their collective input produced a set of recommendations addressing definition, rationale, technique, pharmacology, application areas, and ethics.

The consensus confirmed that the therapeutic effect of mesotherapy arises not only from the local pharmacological action of drugs but also from "mesodermal modulation", in which the dermis itself is considered a therapeutic target. Technical standards include correct needle inclination adapted to anatomical areas and strict adherence to hygiene rules. The use of drug mixtures without supporting evidence was discouraged, while off-label use was considered acceptable only when justified by pathophysiology and safety data.

Strong agreement was reached on applications in localized pain syndromes, rehabilitation, symptoms of chronic venous disease, dermatological disorders, and selected aesthetic procedures. Conversely, insufficient consensus was found for its use in dentistry and immunoprophylaxis, which remain areas for further research.

Ethical principles emerged as a cornerstone of safe practice. Valid informed consent, accurate patient education, transparent documentation, and systematic reporting of adverse events were emphasized. Professional training must be based on scientific evidence rather than empirical tradition. Safety concerns highlighted the risks of infection when hygiene standards are not followed, with a strong recommendation against self-administration and non-sterilized injection devices.

Mesotherapy is a valuable complementary technique when used within evidence-based frameworks. It offers benefits such as lower drug doses, reduced systemic side effects, and effective localized treatment. However, it is fundamentally a pharmacological technique, and those who practice it must possess adequate pharmacological knowledge, both for therapeutic purposes and for the proper management of its potential consequences.

KEYWORDS: mesotherapy, pharmacological technique, scientific literature

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SPINAL PAIN SYNDROME – COLLAGEN INJECTION TECHNIQUES

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ABSTRACT

Spinal pain is a widespread problem in society. Various therapeutic methods are used to treat spinal pathologies. One method is injection collagen therapy. This therapy involves multi-point injections of tropocollagen I. Various injection techniques are used. The most common is mesotherapy, called intradermal therapy (LIT). Injections are administered multi-point, intradermally, to a depth of 3-4 mm, at a 10-15-degree angle. Specialized needles 4-13 mm long and 0.23-0.3 mm in diameter are used. 0.05-0.1 ml of tropocollagen I is administered to each injection point. A subcutaneous technique is also used. Injections are administered at a 45-degree angle. Specialized needles 12-13 mm long and 0.23-0.3 mm in diameter are used. 0.1 ml of tropocollagen I, or even more, is administered to each injection point. Intramuscular injections are also performed at a 90-degree angle, to a depth of 12-40 mm. Specialized needles are used, 12-40 mm long and 0.3-0.4 mm in diameter. Each injection point receives 0.1 ml of tropocollagen I, or even more. The primary goal of these injections is to improve circulation within the treated spine segment and relax tense tissues, resulting in improved mobility and pain reduction. Furthermore, the use of tropocollagen I triggers repair mechanisms. It activates the following mechanisms: induction of fibroblast proliferation, induction of fibroblast migration to the site of injury, stimulation of COL-I synthesis, secretion and maturation, and inhibition of the synthesis of type I metalloproteinase (MMP-1), which degrades COL. In recent years, new publications have emerged demonstrating the effectiveness and safety of these injection techniques. Furthermore, the use of injectable type I collagen appears to yield better results in the long term. However, further research in this area is necessary.

KEYWORDS: mesotherapy, local intradermal therapy, subcutaneous injections, intramuscular injections

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PANEL II: **WOUNDS AND SCARS**

THE ROLE OF INJECTED COLLAGEN THERAPY IN POSTOPERATIVE SCARS

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ABSTRACT

When formulating a therapeutic goal for the treatment of hypertrophic scars, it should be realized that it is individual for each patient. Risk factors influencing the formation of hypertrophic scars include tensions occurring within the wound and fresh scar, especially when it is located in the joint area, on the chest, shoulder blades and lower abdomen.

In the case of a hypertrophic scar occurring in women at the site of a wound after surgery on the thyroid gland, in addition to the aesthetic defect, it may be accompanied by pain, a feeling of pulling, burning, paresthesia, hypersensitivity to touch and clothing, discomfort when speaking, swallowing and turning the head left and right, and chronic redness of the scar. Often, it is not the reduction of the aesthetic defect but the elimination or alleviation of accompanying symptoms that is the main reason for the patient to start treatment.

When choosing a treatment method, it was assumed that a significant improvement in scar volume reduction by 30-50%, a reduction of negative symptoms reported by the patient by more than 50% and/or obtaining sufficient patient satisfaction with the treatment should be achieved after 3-6 treatment sessions or after 3-6 months of therapy.

Considering collagen, sources for the production of injectable formulations are bovine, porcine, equine and human collagen. As a therapeutic product, it has been used so far for modeling nasolabial folds, lips, corners of the mouth, marionette folds, fixed glabella folds, nose and acne scars.

Among collagens, porcine tropocollagen (basic subunit of collagen) type I has a high level of safety and low immunogenicity. The glycoprotein sequences of the α1 chain have 97% homology and those of the α2 chain 94%.

The action of tropocollagen type I in Guna medical products goes beyond classic tissue regeneration – it affects the enzymatic balance (MMPs), stimulates growth factors TGF-β, FGF, EGF and IGF-1, induces matrikines and regulates healing processes by reducing inflammation, which limits uncontrolled fibroblast proliferation leading to scarring, improves scar elasticity, making it less visible and more similar to the natural structure of the skin. Thanks to this, it is effective in reducing scars and persistent symptoms accompanying surgical procedures, including those performed on the thyroid gland in women, and appears as a new, safe product in the hands of a specialist.

KEYWORDS: injectable tropocollagen, treatment of postoperative hypertrophic scars

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TROPOCOLLAGEN BASED TREATMENT OF RECURRENT GENITAL TRACT INFECTIONS

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ABSTRACT

Vulvovaginal infections are a common health issue and one of the most frequent reasons for gynecological consultations among women. Traditional treatment methods, such as antimicrobial, antifungal, and antiviral agents, don't always resolve the problem of recurrent infections and the growing prevalence of drug resistance presents an additional challenge. Furthermore, these treatments often fail to address microbiota disturbances or facilitate the restoration of normal epithelial tissue. Considering that infections can damage the normal structure of the vaginal mucosa and given the properties of collagen, it seems to be a promising element in the treatment of infections. Collagen is the main component of the extracellular matrix (ECM) and according to clinical studies, can be used in wound healing, skin and muscle regeneration.

This article presents the case of a 29-year-old patient, sexually active, with no health conditions, who had undergone two cesarean sections, and who experienced recurrent reproductive tract infections despite antimicrobial treatment based on antibiograms and concurrent treatment with her partner. The patient, with a history of multiple infections and pharmacological treatments, was subjected to therapy using tropocollagen. The goal of the treatment was to support the regeneration of the vaginal mucosa and restore microbiological balance.

After a series of five treatments, performed at intervals of 0-14-28-60-90 days, the patient experienced relief from vaginal symptoms after the second treatment, with complete elimination of symptoms after the fourth treatment. Microbiological results following the therapy showed the presence of physiological flora (Lactobacillus) and no pathogenic flora. Twelve months after the last treatment, during a follow-up visit, the patient reported no symptoms indicating a recurrence of infections.

The results of this case suggest that tropocollagen may serve as an effective alternative or adjunct to traditional therapies in the treatment of recurrent reproductive tract infections. However, further studies involving a larger number of cases are needed to fully assess the efficacy of this therapy in this context.

KEYWORDS: tropocollagen, vaginal infections, vulvar infections, collagen therapy, tissue regeneration

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UTILIZATION OF TROPOCOLLAGEN IN THE TREATMENT OF CHRONIC WOUNDS

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ABSTRACT

Chronic wounds establish a great therapeutic challenge. Among them the most difficult to treat and the most psychologically and socially traumatizing are diabetic foot ulcers. Traditional healthcare systems provide inadequate interventions in most of these cases. The results are devastating numbers of amputations and deterioration of the patients' quality of life.

This lecture highlights the potential of tropocollagen type I as an adjunctive measure in chronic wound treatment. Its high biocompatibility, low immunogenicity, and compatibility with other therapeutic methods are emphasized.

Four clinical cases are presented and among them diabetic foot ulcers, ischemic foot due to peripheral arterial disease, neuropathic ulcers and postoperative wound dehiscence. In each case tropocollagen played a crucial role in successful closure and expected long-term outcome.

Tropocollagen is a great tool for interdisciplinary wound care teams and can significantly improve healing outcomes and enhance patients' quality of life through its regenerative and tissue boosting potential.

KEYWORDS: tropocollagen, chronic wounds, diabetic foot ulcers

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PANEL III: **GYNECOLOGY AND AESTHETIC MEDICINE**

TROPOCOLLAGEN AS A MODERN RESPONSE TO MULTILAYER FACIAL AGING: A FUNCTIONAL MYOREGENERATION APPROACH IN AESTHETIC MEDICINE

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ABSTRACT

Recent advancements in the understanding of facial aging have led to a paradigm shift from surface-level interventions to integrated, multilayer therapeutic strategies. Aging is now recognized as a complex biological process involving the interplay of skeletal remodeling, fat compartment redistribution, connective tissue degradation, and muscular functional decline. This paper presents the concept – a tropocollagen-based biotherapeutic – as a novel and comprehensive tool in aesthetic medicine targeting the muscular component of facial aging.

The ampoule contains type I tropocollagen along with botanical and antioxidant compounds (Hypericum, quercetin, and rutin) and functions by restoring the structural integrity of muscle-associated connective tissues (endomysium, perimysium, epimysium, and fascia). By modulating resting muscle tone, enhancing neuromuscular efficiency, and reducing chronic hypertonicity, collagen supports natural facial dynamics without the rigidity often seen with neurotoxin use. This approach aligns with the modern aesthetic ideal of maintaining expressive variability and natural contour.

Clinical observations, supported by surface electromyography and comparative trials, confirm improved myofascial balance and aesthetic outcomes following collagen administration. The agent proves effective both in the prevention of age-related muscular atrophy and in the therapeutic regeneration of hypertonic or structurally compromised areas, such as platysma or orbicularis oris. The treatment integrates seamlessly into combination protocols targeting dermal and subdermal layers, thereby offering a holistic strategy against intrinsic aging.

Collagen type I represents a promising advancement in the anti-aging arsenal, shifting focus toward functional restoration and harmonious rejuvenation, rather than simple paralysis or volumization.

KEYWORDS: facial aging, myofascial regeneration, tropocollagen, aesthetic medicine,

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PROTOCOLIZED INTEGRATION OF TYPE I COLLAGEN WITH AUTOLOGOUS BIOLOGICS, HYALURONIC ACID, AND ENERGY-BASED DEVICES IN REGENERATIVE AESTHETICS

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ABSTRACT

Type I collagen has re-emerged as a practical biostimulatory scaffold that can be combined with autologous biologics and energy-based devices (EBDs) to support dermal regeneration, hydration, and vascular function. Increasing attention is being paid to sequencing tropocollagen formulations with platelet-rich plasma/fibrin (PRP/PRF), non-cross-linked hyaluronic acid, and devices such as radiofrequency microneedling, fractional CO_2, and thulium lasers.

This approach opens possibilities across multiple clinical indications, including xerotic or lax skin, acne scars, stretch marks, androgenetic alopecia, and uro-gynecologic revitalization. The scientific literature describes mechanisms underlying these synergies: fractional lasers generate controlled microchannels that enhance penetration of active compounds, radiofrequency microneedling promotes collagen remodeling while enabling precise intradermal delivery, and PRP/PRF provides a concentrated milieu of growth factors that stimulate angiogenesis, extracellular matrix synthesis, and wound-healing processes.

The integration of these elements allows for tailored therapeutic strategies that align with patient-specific needs while improving predictability and safety of outcomes. Emphasis is placed on careful technique selection, strict aseptic protocols, the use of ultrasound guidance, and precise dosing. Taken together, these therapeutic frameworks enable more efficient use of available biologics and technologies, minimize unnecessary invasiveness, and synchronize natural regenerative pathways.

KEYWORDS: type I collagen; platelet-rich plasma; radiofrequency microneedling; fractional lasers; laser-assisted drug delivery

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TROPOCOLLAGEN IN ALLEVIATING THE SYMPTOMS OF LICHEN SCLEROSUS – OWN EXPERIENCE

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ABSTRACT

In this article, I discuss the topic of lichen sclerosus (LS), a chronic inflammatory disease that affects the connective tissue of the skin and the mucous membranes of the urogenital areas. I describe how the disease leads to serious anatomical and functional changes, such as narrowing of the vaginal entrance or healing of the labia, and I draw attention to its autoimmune basis, often co-occurring with other autoimmune diseases. In this paper, I discuss the pathogenesis and characteristic features of LS, as well as the use of type I collagen, of porcine origin, in the form of tropocollagen. I would like to point out that tropocollagen, as the smallest collagen molecule, supports the regeneration of damaged tissues, biostimulating the processes of collagen neosynthesis and improving blood supply and tissue plasticity.

In the second part of the article, I present the results of the treatment of lichen sclerosus in about 400 patients who were treated at NZOZ "Medi-Lab" in the years 2018-2025. I describe the methods used, such as laser therapy, HI-FU, platelet-rich plasma, antibiotics, steroids and ointments. I pay particular attention to the use of photodynamic treatment with a wavelength of 620 nm in combination with collagen with B vitamins and collagen with citric acid tropocollagen, which has brought significant results in the treatment of vulvar lichen sclerosus.

KEYWORDS: lichen sclerosus, autoimmune basis, biostimulating, tropocollagen

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TROPOCOLLAGEN IN AESTHETIC AND REGENERATIVE GYNECOLOGY

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ABSTRACT

The evolving field of aesthetic and regenerative gynecology seeks minimally invasive, integrative solutions to chronic female conditions such as vulvovaginal atrophy, lichen sclerosus, postmenopausal sexual dysfunction, and urinary incontinence. Tropocollagen – a precursor form of collagen with bioactive regenerative properties – has recently gained attention for its therapeutic applications in gynecology. Drawing on personal clinical experience and multidisciplinary practice, this abstract presents the implementation of injectable tropocollagen preparations in both functional and aesthetic indications. A combination approach was emphasized, integrating tropocollagen with physiotherapy, laser therapy, high-intensity focused ultrasound (HIFU), radiofrequency, and platelet-rich plasma where appropriate. Patients with diverse backgrounds – including that post-stroke with neurogenic pelvic dysfunction and breast cancer survivors with estrogen contraindications – benefited from individualized tropocollagen protocols. Case studies demonstrated significant reductions in pain, pruritus, and scarring in vulvar dermatoses; restored sexual function in patients with atrophy or post-oncologic treatment; and improved continence outcomes when administered periurethrally, especially when combined with adjunctive technologies. Patients reported measurable functional recovery, including resumption of sexual activity, and decreased reliance on hormonal therapy or surgical interventions. Notably, early application of tropocollagen proved critical in halting degenerative changes in lichen sclerosus and maintaining structural integrity in post-operative care. Tropocollagen's safety profile and biocompatibility render it particularly suitable for fragile mucosa and for patients with complex contraindications. This approach underscores the need for a holistic and patient-centered paradigm in gynecology—one that transcends symptomatic treatment and instead supports true tissue regeneration and quality-of-life restoration. The data presented advocate for broader clinical integration of tropocollagen and support further prospective studies to standardize protocols and outcome measures in regenerative gynecology.

KEYWORDS: injectable collagen, aesthetic gynecology, regenerative medicine, lichen sclerosus, urinary incontinence

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COLLAGEN MESOTHERAPY DURING MENOPAUSAL TRANSITION

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ABSTRACT

Genitourinary syndrome of menopause (GSM) describes a variety of unpleasant genital, sexual and urinary symptoms that can either be isolated or coexisting and are not related to other medical conditions. GSM is a chronic and progressive condition that requires early recognition, due to the rapid decline in female estrogen secretion, and appropriate management to preserve urogenital health. Moreover, GSM significantly affects the quality of women's lives. The risk of urinary incontinence, one of the GSM symptoms, 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 and vulvovaginal atrophy. Pregnancy also 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 slow down the degradation process. A pilot study was conducted in a group of 5 women with confirmed urinary incontinence. Injection collagen therapy was used in the form of periurethral, transvaginal and suprapubic subcutaneous or intradermal injections – mesotherapy. Four series of treatments were performed at 14-21-day intervals, using the preparations alternately, starting with MD – Matrix. According to the study, improving the structure of the pelvic floor tissues may be a key strategy for the treatment of GSM. 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 in menopausal transition.

KEYWORDS: menopausal transition, mesotherapy, tropocollagen I

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PANEL IV: **REHABILITATION**

THE ROLE OF REHABILITATION AFTER INJECTION COLLAGEN THERAPY IN THE THREE-STAGE TREATMENT CONCEPT

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ABSTRACT

The three-stage treatment concept includes: 1. Assessment of risk factors, their reduction, or modification. 2. Implementation of specialized medical therapy, in this case – injection collagen therapy. Typically, this stage consists of five treatments, repeated weekly. 3. After completing medical therapy, implementation of physiotherapy. Importantly, physiotherapy should be initiated at the appropriate time. The aim of injectable collagen therapy is to relax tense soft tissues (muscles, tendons, fascia, ligaments), improve mobility, reduce pain, and restore local circulation. Consequently, the patient is prepared for the physiotherapy process. Because patients often experience exacerbations of chronic musculoskeletal pathologies, such preparation allows for the physiotherapy process to be conducted with improved mobility, less pain, or no pain. As a result, the effects of such therapy are significantly improved. Furthermore, starting the third stage too early could result in faster absorption of type I collagen into the bloodstream, and the effects of the second stage being ineffective. In the third stage, movement therapy is primarily used, supplemented in certain cases with physical therapy. Kinesiotherapy typically lasts 2-3 months to achieve good results, especially in patients who have not previously engaged in this type of activity. Throughout the three-stage approach, the patient receives education from both the physician and the physical therapist. The rehabilitation process.

KEYWORDS: physiotherapy, collagen type I, tropocollagen I, injection

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PHYSIOTHERAPEUTIC TREATMENT AFTER INJECTABLE COLLAGEN THERAPY IN THE COURSE OF GREATER TROCHANTERIC PAIN SYNDROME (GTPS)

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ABSTRACT

Greater trochanteric pain syndrome occurs in a significant number of patients, more often in women. This problem most often affects people aged 40-60 and is associated with a sedentary, overloaded, and non-ergonomic lifestyle/work accompanied by a lack of regular physical activity. It can also occur in the course of other musculoskeletal disorders, in particular osteoarthritis (gonarthrosis, coxarthrosis, spondyloarthropathy). The most common etiology of GTPS is tendinosis or rupture of the gluteus medius, gluteus minimus, or both muscles at the greater trochanter, i.e., GTPS types II → V. Treatment involves steroid injections and physical therapy. One of the new methods is collagen injection therapy. Its mechanism of action is described as chemical, using a medical device, and mechanical, related to the injection. This therapy uses tropocollagen I, a protein derived from pigs, which aims, among other things, to regenerate inflamed tendon attachments to bone. Various repair mechanisms are activated, including the induction and proliferation of fibroblasts, as well as their migration to the affected area. This is followed by the stimulation and synthesis of type 1 collagen (COL-1), its secretion and maturation. Ultimately, a regenerative effect is achieved. Treatment involves changing movement habits to correct sitting and weight bearing, weight loss, and the use of broadly defined physiotherapy tailored to the individual patient and their condition, particularly exercises that utilize eccentric contraction. Education combined with physical exercise leads to greater pain relief and overall functional improvement compared to corticosteroid injections or no treatment. Physical exercise should be introduced gradually so as not to damage the rebuilding attachment. Physical therapy supports treatment with movement. Magnetic fields, ultrasound, laser therapy, TENS, heat, or cold are recommended. Sometimes SWT (shock wave therapy) is recommended, but the author does not confirm its effectiveness based on her own research. The use of kinesiotaping is also beneficial. Physical therapy for different types of GTPS may vary and should be targeted individually.

KEYWORDS: collagen type I, enthesopathy, bursitis, rehabilitation

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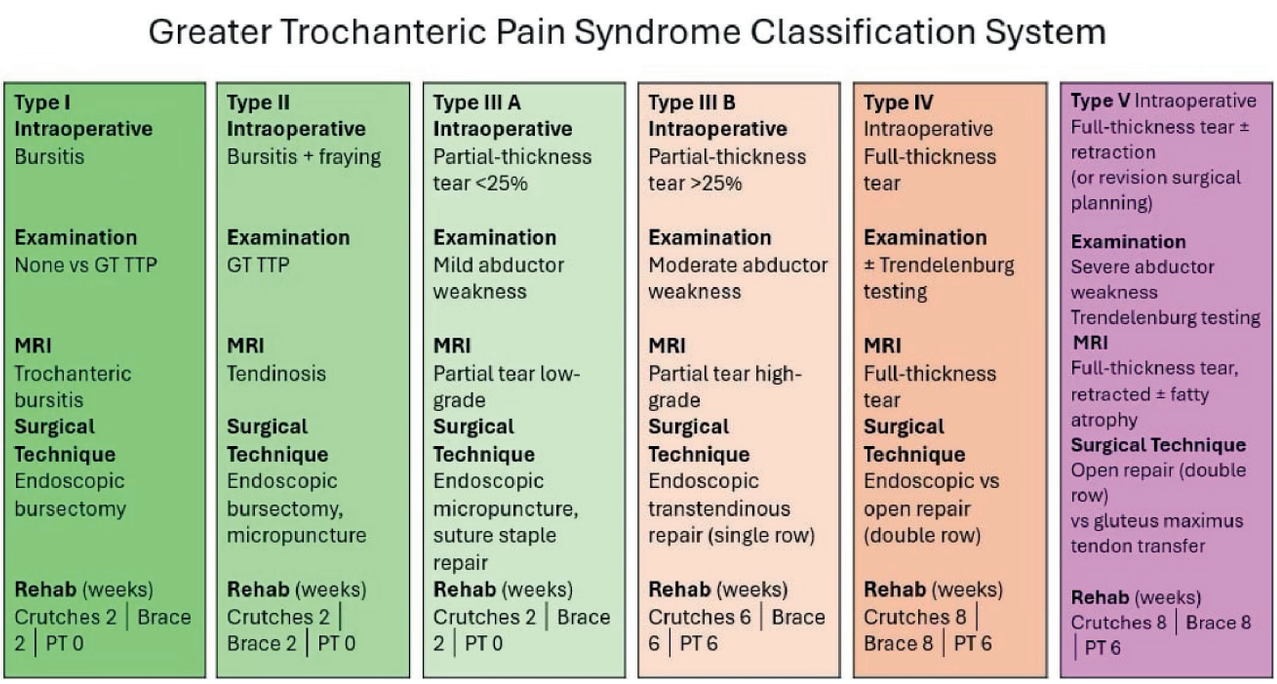

Fig. 1. GTPS types [wg Lall AC et al.].

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REHABILITATION STRATEGIES AFTER INTRA-ARTICULAR COLLAGEN AND HYALURONIC ACID INJECTIONS FOR KNEE OSTEOARTHRITIS

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ABSTRACT

Knee osteoarthritis (OA) is the most frequently diagnosed musculoskeletal disorder and represents a significant challenge for modern medicine and physiotherapy. It is estimated that by 2050, the global number of patients will reach nearly one billion, leading to a rapidly increasing burden on healthcare systems. The clinical presentation of knee OA includes chronic pain, limited range of motion, stiffness, joint instability, as well as impaired muscle coordination and proprioception, all of which substantially reduce patients' quality of life. In response to growing therapeutic demands, combined treatments are increasingly being used, integrating injectable collagen therapy and hyaluronic acid therapy with comprehensive physiotherapy.

Intra-articular and periarticular procedures performed by physicians aim to reduce pain and inflammation, improve joint structure elasticity, and create optimal conditions for kinesitherapy.

Close collaboration between physicians and physiotherapists is essential to enable rehabilitation to be initiated alongside injection-based procedures. Physiotherapy management includes initial joint unloading, manual therapy, and stabilizing and breathing exercises. In subsequent stages, soft tissue mobilizations, proprioception exercises, and progressive strength training are introduced, focusing particularly on strengthening the quadriceps femoris and gluteus medius and minimus muscles, which help stabilize the lower limb axis.

Moderate-intensity aerobic activity (above 60% HRmax), such as swimming or cycling, is an important component of general physical conditioning and supports the improvement of cardiovascular and respiratory function. Long-term therapy also includes stretching and mobility exercises, with a recommended duration of 8–12 weeks and follow-up assessments at 3 and 6 months. Patient education is an integral part of the process, emphasizing the importance of active participation in rehabilitation.

Collagen therapy should be considered a supportive method rather than a replacement for kinesitherapy and other physiotherapy techniques. A comprehensive, interdisciplinary approach is key to optimizing treatment outcomes and improving the quality of life of patients with knee osteoarthritis.

KEYWORDS: knee osteoarthritis, collagen therapy, hyaluronic acid, physiotherapy, kinesitherapy, proprioception, manual therapy, rehabilitation, knee pain

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THE IMPACT OF MECHANICAL LOADING ON THE EFFECTIVENESS OF COLLAGEN INJECTIONS: MECHANOBIOLOGICAL IMPLICATIONS FOR CLINICAL PRACTICE

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ABSTRACT

The effectiveness of collagen injections for musculoskeletal disorders may depend not only on the product's composition and the injection technique, but also on the mechanical environment in which tissues function after the procedure.

At the cellular and molecular levels, ligament and tendon cells sense mechanical stimuli via integrin receptors, adhesion complexes, and mechanosensitive channels, triggering MAPK/ERK and PI3K/AKT cascades that regulate collagen expression, metalloproteinase activity, and the organization of ECM fibers.

Physiological, graded loading promotes balanced fibrillogenesis and maintenance of a ligament–tendon phenotype, whereas overloading or unloading disrupts homeostasis and amplifies catabolic processes. These mechanisms provide a biological rationale for the hypothesis that appropriately selected loading after a collagen injection can guide the implanted substrate and matrix remodeling toward a more ordered architecture, potentially enhancing the clinical effect.

Review data from tendon and ligament cell biology highlight the key role of the integrin–FAK–AKT/mTOR coupling in regulating collagen synthesis under stretch, as well as differences in responses to tension, shear, and compression. Meanwhile, available clinical reviews suggest that collagen injections may alleviate pain and improve function in selected conditions, although heterogeneity of protocols limits conclusions about optimal regimes.

On this basis, we propose a management framework: a brief protective period after injection (pain/edema control), followed by progressive, low- to moderate-intensity cyclic loading directed axially, while avoiding early stimuli that induce excessive shear or compressive stress.

Integrating collagen injections with precisely dosed mechanotherapy is biologically sound; prospective studies are needed to define the time window, loading doses, and biological response indicators (e.g., biomarkers of ECM remodeling) to optimize the effectiveness of this intervention.

KEYWORDS: mechanotransduction, collagen injections, mechanical loading, integrins–FAK–mTOR, ECM remodeling

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USE OF TROPOCOLLAGEN IN NEUROLOGICAL REHABILITATION

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ABSTRACT

Neurological rehabilitation is a specialized process aimed at restoring the greatest possible physical, cognitive, and emotional functioning in people with damage to the central or peripheral nervous system. The most common conditions requiring comprehensive neurological rehabilitation include stroke, traumatic brain injury or spinal cord injury, multiple sclerosis, Parkinson's disease, neuropathies and peripheral nerve injuries, and tumors of the brain and spinal cord.

One of the most frequent issues disrupting the neurological rehabilitation process is pain. Ineffective management of nociceptive pain carries the risk of central sensitization and a shift in the pain phenotype toward neuropathic pain features. Clinical problems generating pain in early neurological rehabilitation include: enthesopathies, overuse syndromes of muscles and joints, spine pain syndromes, degenerative joint disease, scars, and wounds. Therapeutic approaches used to treat such pain include therapeutic exercise, physical therapy modalities, pharmacotherapy (often limited by poor drug tolerability and multimorbidity with potential interactions), and injectable collagen therapy. Case examples of the use of tropocollagen as a method supporting the process of comprehensive neurological rehabilitation were presented.

KEYWORDS: neurological rehabilitation, pain, tropocollagen

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PANEL V: **CASES STUDY**

USE OF COLLAGEN IN TREATMENT OF NASAL SEPTUM PERFORATION – CASE STUDY

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ABSTRACT

Nasal septum perforations are usually caused by overuse of decongesting nasal drops (allergic and non-allergic chronic rhinitis), complications of nasal septum surgery, autoimmune disorders (vasculitis, Wegener`s disease) and trans nasal intake of addictive drugs (cocaine, heroin, others). Depending on the reason, septum defects may present different size and location, including both cartilaginous and osseous parts of it.

Case study presents a 27-year-old female with history of several years of drug addiction (trans nasal drugs intake) with clear history of any chronic diseases. Clinical manifestations included nose congestion giving difficulty in breathing prevailingly during sleep, occasional nose bleeding of minor or mild severity, permanent need of nose clearing, and air intake turbulence heard as whistling and whizzing in the nose. The patient also suffered psychological and social problems. Anterior rhinoscopy revealed 6 mm diameter nasal septum perforation, involving mucosa and cartilage.

At first step we anti-inflammatory treatment was applied (antibiotic-steroid application for 10 days), secondly nutrition of mucosa with (vitamin A + D-panthenol + oat proteins + Vaseline) ointment for 30 days, followed by submucous collagen injections into perforation edge and 2 mm margin around perforation, 6-8 points, 0,05 to 0,1 ml each, 6 sessions every 2 weeks. After three months' observations, a full closure of the perforation was realized.

The conclusion was that collagen injections proved to be efficient in healing septal defect in experimental approach. The injection procedure should follow a prior anti-inflammatory and mucosa nutrition therapy to eliminate inflammation, necrotic tissue, improve blood supply to the tissue, and improve conditions for regeneration. The recommended amount of collagen administered, and frequency of administration still needs to be assessed empirically, therefore we need more studies and more cases to be observed for further conclusions. It is assumed that collagen seems to be a good support in treatment of minor or medium-sized septum defects, whilst major perforations should be subjects for a combined cartilage draft/collagen/chondrocytes therapies however this direction of treatment still needs more exploration.

KEYWORDS: collagen, septum perforation, nose, rhinoscopy, mucosa nutrition therapy

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TROPOCOLLAGEN INJECTION AS AN EFFECTIVE THERAPY FOR LUMBAR SPINE PAIN IN AN ELDERLY PATIENT

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ABSTRACT

Chronic lumbar spine pain is a common condition among the elderly, often leading to decreased mobility, loss of independence, and reduced quality of life. This case study describes the clinical course and treatment outcomes of a 74-year-old male patient with chronic lower back pain secondary to spinal osteoarthritis. The patient had several comorbidities, including hypertension, hypercholesterolemia, and benign prostatic hyperplasia.

The patient experienced pain exacerbations approximately every three months, significantly impairing his daily functioning. Oral pharmacological treatment proved challenging due to poor tolerance of non-steroidal anti-inflammatory drugs (NSAIDs), which led to elevated blood pressure and gastrointestinal discomfort. Although paracetamol was well tolerated, it provided insufficient analgesia. The combination of paracetamol and tramadol was more effective but caused adverse effects such as dizziness and nausea.

Due to the limitations of oral pharmacotherapy, a novel treatment approach was implemented using injectable tropocollagen. The patient received five injections administered at weekly intervals. After the first dose, he reported initial pain relief, with substantial improvement noted by the third session, allowing for discontinuation of paracetamol. Following the final injection, the patient reported complete resolution of pain symptoms.

This positive outcome enabled the patient to increase physical activity, including walking and using a stationary bike, and to initiate physiotherapy. The treatment was well tolerated, with no adverse effects reported.

This case supports the potential of injectable tropocollagen as a safe, well-tolerated, and effective treatment option for chronic spinal pain in elderly patients.

KEYWORDS: tropocollagen, injectable therapy, chronic low back pain

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INJECTION COLLAGEN THERAPY IN SLOW-HEALING WOUNDS

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ABSTRACT

Slow-healing wounds are still huge medical problems, that need to implement new and innovative methods of treatment to increase healing processes. This case study describes 4 different types of wounds in which collagen mesotherapy was used as an additional method of treatment.

First patient underwent several laparotomies and suffered from skin and subcutaneous tissue loss after removing ileostomy after restoring the continuity of the gastrointestinal tract.

10.12.2024 08.01.2025

Fig. 1a. After restoring the continuity of the digestive tract and removing the ileostomy. First collagen injection **1b.** Final result after 3 collagen injections

Second patient with perforated diverticulitis underwent Hartmann's Procedure and suffer from non-healing skin fistula

29.01.2025 26.02.2025

Fig. 2a. Cutaneous fistula before treatment **2b.** Final result after 4 collagen injections

Third patient with diabetic foot and atherosclerosis with non-healing wound after lower leg amputation.

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Fig. 3a. Non-healing wound after lower leg amputation **3b.** Final result after 4 collagen injections

Fourth patient with II/III dg thermal burn of the anteromedial surface of the left lower leg, involving the ankle joint (medial malleolus).

28.01.2025 03.04.2025

Fig. 4a. II/III-degree thermal burn of the lower leg **4b**. Result after 8 collagen injections

In each case a significant acceleration of wound healing, improvement of patient comfort and shortening of hospitalization time were achieved. No adverse effects of injectable collagen therapy were observed.

KEYWORDS: tropocollagen, Injectable therapy, non-healing wound, slow-healing wound

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CHRONIC FACIAL NERVE PARALYSIS FOLLOWING DENTAL PROCEDURES: A CASE REPORT ON THE EFFICACY OF TROPOCOLLAGEN THERAPY

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ABSTRACT

Facial nerve paralysis is a rare but life-altering complication that may arise unexpectedly in the aftermath of routine dental procedures. This case report outlines the clinical progression and long-term treatment of a 43-year-old female patient who developed chronic paralysis of all branches of the left facial nerve following standard infiltration anesthesia during dental treatment in 2016. Initial symptoms included marked facial asymmetry, complete loss of forehead mobility, oral dysfunction (inability to control fluids), left-sided lagophthalmos, and immobilization of the platysma. Despite early initiation of pharmacotherapy and physical rehabilitation – including galvanization, facial massage, and Solux lamp therapy – only minimal recovery was noted after three months, with approximately 70% functional deficit persisting.

In 2022, six years post-onset, a novel intervention was introduced involving injectable tropocollagen therapy. Over the course of multiple treatments between 2022 and 2025, the patient demonstrated progressive improvements in facial symmetry, voluntary motor control (including brow elevation and smile dynamics), and resolution of involuntary eyelid closure during smiling. The most significant progress was observed in the periorbital and oral regions, with regained ability to raise eyebrows and form expressive facial gestures.

This case supports the hypothesis that tropocollagen-based therapy may offer regenerative benefits even in long-standing peripheral facial nerve injuries, potentially through enhanced extracellular matrix remodeling and myofascial reactivation. Continued interdisciplinary collaboration is essential to refine therapeutic protocols for facial nerve paralysis with idiopathic or iatrogenic etiology.

KEYWORDS: facial nerve paralysis, dental anesthesia complications, tropocollagen, facial rehabilitation, case report

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INJECTABLE COLLAGEN THERAPY IN GUM REGENERATION

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ABSTRACT

Injectable collagen has emerged as a promising approach for gum regeneration, particularly in periodontal treatment, due to its biocompatibility and ability to promote tissue healing. Various studies have corroborated the effectiveness of injectable collagen in facilitating periodontal tissue regeneration by providing suitable scaffolds for cell attachment and growth. Furthermore, injectable collagen formulations, particularly when combined with mesenchymal stem cells (MSCs), can significantly boost periodontal regeneration. The integration of MSCs into collagen systems allows for enhanced cellularization and vascularization of treated areas. This synergy between collagen scaffolds and stem cells enhances not only cell adhesion but also the overall regenerative outcome (Sharifi et al., 2022).

Porcine origin tropocollagen type I has been used in patient with tooth hypersensitivity, papillary loss, gum recession and gum thin biotype. All presented cases benefited from tropocollagen usage. Hypersensitivity decreased from 8 to 2 in VAS scale. Gum thickness has been improved significantly from 1 to 2 mm depending on case and primary factors.

In summary, the use of injectable collagen, particularly in combination with MSCs, and growth factors, reflects a multifaceted strategy for improving periodontal regeneration. This approach aligns with contemporary research that emphasizes the importance of scaffolding materials in dental tissue engineering, resulting in substantial advancements in regenerative dentistry.

KEYWORDS: tropocollagen, gum regeneration, gum recession, papillary loss, tooth hypersensitivity

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GLUTEAL MUSCLE FAILURE IN TENNIS PLAYER AND COLLAGEN INJECTION THERAPY – CASE STUDY

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ABSTRACT

The presented clinical case concerns a 21-year-old man, a tennis player, who reported pain in the lateral part of the right hip, without trauma. Pain in the lateral part of the right hip and right gluteal muscles and limited mobility have prevented him from functioning and playing tennis for 3 months. Initially, the patient was treated with physiotherapy, analgesics, and anti-inflammatory medications, without achieving therapeutic results. After clinical examination and diagnosis of greater trochanter pain syndrome due to overloaded gluteal muscles (gluteus minimus and medius), injection collagen therapy was implemented. Tropocollagen I was used in combination with hypericin. The procedure was performed 5 times, at weekly intervals. The injections were made into trigger points in the projection of the gluteal muscles, in the projection of their attachments to the greater trochanter. Significant improvement was achieved, reducing pain and improving mobility. Targeted physiotherapy exercises, strengthening, and relaxation of the gluteal muscles were then implemented, initially without stretching exercises. Additionally, a modification to the pre-tennis warm-up was implemented. The patient returned to playing tennis.

KEYWORDS: collagen type I, tropocollagen I, gluteus minimus, gluteus medius, injections

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