The significance of complexity by using collagen injections – experiences in locomotor rehabilitation and sports medicine

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Simple definition of complexity: the quality or state of not being simple: the quality or state of being complex

„The precise meaning of complexity remains elusive, but to get the aim with it is concrete.“
Question of complexity

- Locomotor rehabilitation and sports medicine are very big and special field where complex physiotherapy play first fiddle. The aim of the therapy is to promote pain relief, tissue repair, functional recovery like by the help of collagen therapy. Drug treatment, among others topical analgesia, steroid treatment, non-steroid anti inflammatory drugs and opioids as well can cause many side effects and complications, therefore no recommended often to use, even though have anti inflammatory impact and effect of pain relieve.
What is physiotherapy?

- **Physiotherapy** is a branch of rehabilitative medicine aimed at helping patients maintain, recover or improve their physical abilities. **Complex physiotherapy** means not only therapeutic exercise, but others mechanotherapy, like massage and ultrasoundtherapy, electrotherapy, Bemer therapy, magnetic therapy, laser therapy, hydrotherapy, balneotherapy – with baths and bathing, especially in natural mineral waters - , phototherapy (light therapy), climatetherapy and thermotherapy as well. All of them are able to help by musculoskeletal disorders. How can they do this? **They can** - among others - relax muscle, relief pain as **improve the microcirculation locally in myofascial network** and in several case in the whole body.
Connection of „chain links” - the significance of each „steps”

- Impairment- disability- handicap
- Pain relief – tissue repair- functional recovery
- Processes have to need special approach of treatment
- Teamwork, teamspirit
- Complexity- complex therapy
- Collaboration
- ... to the Final Result
How large is the significance of microcirculation?

- Microcirculation as the largest organ of our body is the most important part of the human circulatory system in terms of function and takes place in the finely and extremely entwined network of the smallest blood vessels. Here fulfills vital transport functions: it supplies the cells, tissues and organs with oxygen, nutrients - like collagen-, disposes of metabolic endproducts and boosts the immune system.
How long is our **microcirculatory system** – can you imagine it?

The largest organ of our body

120,000 km.
3 times so long like equator
And how large is the surface of endothelial cells, where the metabolism happens?

The largest organ of our body ... like a soccer field...
What do you need to get your destination?
She has got motorway ...
In the same way...
What can cause impaired microcirculation?

• A restricted or impaired microcirculation leads to faster aging of the cells and is the cause of many disorders and illnesses.
Producing collagen

- Collagen is produced by specialized cells called **fibroblasts**. But degree of efficiency of producing depends a lot on wholeness of the microcirculation (myofascial network) and therefore the aerob metabolism in this cells.
Types of collagen

- They are present in our body as follows:
  - Type I: Bones, tendons, ligaments and skin
  - Type II: Cartilages and structure of the eyes
  - Type III: Liver, lungs and arteries
  - Type IV: Kidneys and several internal organs
  - Type V: Surface of cells, hair and placenta

Now then where can we find the role of collagen in musculoskeletal disorders?
First of all we have to see the most important area: the joint and around the joint. (mostly Type I. and II- look at the location of them)
Collagen has structural and functional roles in it.
Structural and functional roles of collagen

- **Structural role:**
  - Ligaments contain collagen more than 75-90 % of dry living matter. Thanks to structure of collagen you can realise extreme mechanical accomplishments.
  - high grade stability
  - high grade resistance
  - high grade elasticity
  - high grade uncompressibility
  - and high grade ability of twisted motion

- **Functional role:**
  - collagen has got necessary role in tissue repair
  - in induction of collagen synthesis by integrin
  - to rebuild the fibersystem after mechanical impact
  
The process of „impairment- disability- handicap” always begins at the cellular level therefore we have to step in as soon as possible.
When should we think about collagen therapy in musculoskeletal disorders?

- injuries, sports injuries: injury of muscles, injury of tendons and ligaments
- arthrosis (hypermobility and arthrosis picture - slide)
- tendinopathy (tendinitis + tendinosis picture – slide)
- small joints disorders
Corticosteroids - wide range of side effects.

The risk of experiencing side effects largely depends on:

- **the type of steroid** you are taking - steroid tablets (oral corticosteroids) are more likely to cause side effects like inhalers or injections
- **the dose** - the higher the dose, the greater the risk of developing side effects
- **the length of treatment** – for example it can more likely to develop side effects if taking for more than three weeks
- **the age** – young children and the elderly are more likely to experience side effects
Steroid injections- side effects

• Steroids that are injected into muscles and joints may cause some pain and swelling at the side of the injection. However this should pass within a few days.

• **Steroid injections can also cause muscle and tendon weakness and rupture**

• Other possible side effects can include **blushing** and may be **hypertension**

• Because of the risk of side effects, steroid injections are often **only given at intervals** of at least six weeks and a **maximum of three-four injections into one area** is usually recommended.

• Intravenous steroids may sometimes cause more side effects
Oral steroid - side effects: long-term use

- increased appetite
- acne
- muscle weakness and rupture
- tendon injuries
- thin skin
- delayed wound healing
- Cushing’s syndrome
- weakening of the bones
- osteoporosis
- diabetes mellitus
- high blood pressure
- glaucoma and cataracta
- stomach ulcers
- mental health problems, such as depression, other disturbances, that includes aggression and mania as well
- anxiety and hallucinations
- the steroids can harm the central nervous system and it may be at high risk of psychosis
- increased risk of infection
- gastrointestinal bleeding, nose bleeding
Advantages of collagen

- effective and causal therapy
- easy and safe to apply
- useful in itself or complementary therapy
- large area of indication
- analyzed dopingfree product
My experiences with collagen in hungarian first league of handball...

- As the teamdoctor for Orosháza men’s handball team I’ve been getting of experiences with collagen in treatment of injuries
Supraspinatus Tendinitis

- Supraspinatus Tendinitis is also referred to as Rotator Cuff Tendonitis, Swimmer's Shoulder, Pitcher's Shoulder or Tennis Shoulder.
Supraspinatus Tendinitis

- **Tendinitis is inflammation** in a tendon. The inflammation of tendinitis is usually a result of tiny tears or repetitive irritation of the tendon.
- There are 2 types of rotator cuff tendonitis; **acute and chronic**.
Supraspinatus Tendinitis

**Acute tendinitis**
- Acute tendinitis refers to inflammation that **comes on suddenly**:
- Usually from a **shoulder injury**, such as a fall causing dislocation (typically a person may even develop **Frozen Shoulder**),
- From **overloading** of exercises, lifting something too heavy overhead.

**Chronic tendinitis**
- Chronic tendinitis **develops over-time** and generally results from **long term repetitive use** of the rotator cuff tendons:
- **Common activities** that cause chronic tendinitis in the rotor cuff are activities like weight lifting, painting, and repetitive throwing in sports.

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Signs and locations...

- With both types of tendinitis, **the condition can be very painful**. Likely you have **periods where it flares up, and periods when it feels somewhat better** after it has been rested or the repetitive motion that irritates it has been stopped.
- Although tendinitis can occur in any of the rotator cuff tendons, the **supraspinatus tendon is most likely to injury**. Due to its location at the top of the shoulder, the tendon is at **risk of irritation, wear and tear, and/or nerve becoming trapped in the soft tissues of the shoulder (impingement)**. Using your arm for many daily activities which can lead to chronic tendinitis
Symptoms of Rotator Cuff Tendinitis

- The symptoms of chronic rotator cuff tendinitis usually begin with **mild pain in the shoulder that gradually becomes worse**. Acute symptoms will come on more suddenly. If you have rotator cuff tendinitis, some possible symptoms may be.
- **Pain in the top and front of your shoulder**
- **Limited range of motion** in your shoulder's glenohumeral joint.
- **Tenderness and a burning** sensation in your shoulder.
- **Difficulty sleeping** at night due to pain, especially when lying on the affected shoulder.
- **Difficulty with simple movements** such as brushing hair, putting on your shirt or jacket, reaching the arm above shoulder height.
- A feeling of **weakness** in the shoulder, especially with pushing and overhead movements.
Rotator Cuff Tendinitis Treatments

- If you have a rotator cuff tendinitis **rest** is highly recommended.
- **Avoid activities that cause pain or may have caused the inflammation** and begin **cold compression** treatments as soon as possible.
- The trick to healing rotator cuff tendinitis and getting shoulder back in the best possible condition you can is getting it to **heal with minimal scar tissue** - something blood flow stimulation therapy (**complex physiotherapy**) and collagen therapy are great at! The healing of tendinitis properly and treat scar tissue build up with collagen as well, the chance of re-injury or chronic shoulder conditions later on is much lower than average.
- There are healing tools and methods that can help treat supraspinatus tendinitis and speed up the healing process to get back to a life without pain and risk of further injury:
My treatments experiences

Collagen injection

shooting 5-6 times! Locally ampul of specific of body regions
+ ampul of Neural: dominated by irradiated pain
+ ampul of Muscle: secondary local spasms
+ ampul of Matrix: dominated by swelling
+ ampul of Poly: dominated by pain
+ ampul of Tissue: always building into therapy:

Tissue repair – most common to use!
individual combinations: depends on symptoms and status
repetitive injections: in case of chronic process per month
My treatments experiences

• **Blood flow stimulation and pain relieve methods and tools** will treat impaired and scar tissue as promote blood flow to heal tendinitis, like

  - shock wave therapy
  - iontophoresis
  - TENS and other kind of elektrotherapy
  - Ultrasound therapy
  - **Bemer** – vasomotion effect
  - laser therapy
  - strengthening exercises – improving range of motion, muscle strength - functional recovery+ kinesio taping

• **Cold therapy**

  • limit the amount of damage within the first 48-72 hour. Cold compression therapy will relieve pain and swelling of both chronic and acute tendinitis. It is important to decelerate cellular break-down and tissue and numb the nerves and reduce pain!
Medial Epicondylitis

- is commonly known as **golfer's elbow**. This does not mean that only golfers have this condition. But the golf swing is a common cause of medial epicondylitis. Many other repetitive activities can also lead to golfer's elbow: throwing, chopping wood with an ax, running a chain saw, and using many types of hand tools. Any activities that stress the same forearm muscles can cause symptoms of golfer's elbow.
Symptoms

• What does golfer’s elbow feel like?

• The main symptom of golfer’s elbow is tenderness and pain that starts at the medial epicondyle of the elbow. The pain may spread down the forearm.
Medial Epicondylitis - my treatments experiences

- **Shock wave therapy** is a newer form of nonsurgical treatment. It uses a machine to generate shock wave pulses to the sore area. Patients generally receive the treatment once each week for up to three weeks. It is not known exactly why it works for golfer's elbow, but recent studies indicate that this form of treatment can help ease pain, while improving range of motion and function.

**Occupational therapy**

- **Physical therapy + kinesio taping**
- **To protect the elbow – sports equipment-orthosis** - Keep your elbow safe!

- Your therapist may apply ice and **electrical stimulation** to ease pain and improve healing of the collagen. Therapy sessions may also include **TENS and iontophoresis** which uses a mild electrical current to push anti-inflammatory medicine to the sore area
- **Bemer,ultrasound,laser**
Medial Epicondylitis - my treatments experiences

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Lateral Epicondylitis

• commonly known as **tennis elbow**, is not limited to tennis players. The backhand swing in tennis can strain the muscles and tendons of the elbow in a way that leads to tennis elbow. But many other types of repetitive activities can also lead to tennis elbow: painting with a brush or roller, running a chain saw, and using many types of hand tools. Any activities that repeatedly stress the same forearm muscles can cause symptoms of tennis elbow.
Symptoms

• What does tennis elbow feel like?

The main symptom of tennis elbow is tenderness and pain that starts at the lateral epicondyle of the elbow. The pain may spread down the forearm. It may go as far as the back of the middle and ring fingers. The forearm muscles may also feel tight and sore.
Lateral Epicondylitis - my treatments experiences

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Prevalence of elbow pain

Tennis Elbow and Golfer’s Elbow

• ME is often discussed in conjunction with lateral epicondylitis (LE), which occurs much more frequently. ME is the most common cause of medial elbow pain, although the clinician is likely to see at least 5 cases of LE for every case of ME. Histologically, damage to the involved tendons has been described as angiofibroblastic hyperplasia tendinosis and fibrillar degeneration of collagen.¹
Ankle Sprain

- Sprains to the ankle are **one of the most common sporting injuries**. A sprain is defined as a tearing of the ligaments that connect bone to bone and help stabilise the joint.

- **Sports requiring jumping, turning and twisting movements** such as handball, basketball, volleyball and football; and explosive changes of direction such as soccer, tennis and hockey are particularly vulnerable to ankle sprains.

- Following an ankle sprain, the ankle joint may become unstable and take a long time to recover.
History- Ankle Sprain

- A sprain is defined as a **tearing of the ligaments**
- On the **inside of the ankle (medial side)**, the joint is stabilised by a thick, strong fibrous ligament called the deltoid ligament. **Sprains to the deltoid ligament** (eversion sprains, foot twists outward) account for less than 20% of all ankle sprains.

- On the **outside of the ankle (lateral side)**, the joint is stabilised by three smaller ligaments; the anterior **talofibular** (most commonly injured, at the front), the calcaneofibular (at the side) and the posterior talofibular (at the back). **Sprains to any of these ligaments** (inversion sprains, foot twists inward) account for more than 80% of all ankle sprains. (lateral ligament injuries)
Lateral ligament injuries

- Usually a result of a forced plantarflexion/inversion movement, the complex of ligaments on the lateral side of the ankle is torn by varying degrees. Although the “sprained ankle” is a relatively benign injury, inadequate rehabilitation can lead to a chronically painful ankle, reduced functional ability and increased likelihood of re-injury. Care should also be taken to avoid missing the less common causes of ankle pain, namely; small fractures around the ankle and foot (e.g. Pott's fracture) and straining or rupture of the muscles around the ankle (e.g. calf, peroneii, tibialis anterior).
Treatment and rehabilitation

- **Reduce pain and swelling**

  *Initial management (i.e. within the first 48-72 hours) of an acute lateral ligament injury is to reduce pain and swelling by following the **RICE** regimen; **Rest, Ice, Compression and Elevation**.*

  If WB is too painful, the patient can be given *elbow crutches* and be *non-weight bearing (NWB) for 24 hours*. However, it's important that at least partial weight bearing (PWB) is initiated relatively soon, together with a normal heel-toe gait pattern, as this will help to reduce pain and swelling.

  Gentle soft tissue **Massage** (STM) can be performed to assist with the removal of oedema and gentle stretches, as long as this is pain free.
• **Restore ROM**
  As soon as pain allows, the patient should begin pain free active range of movement (ROM) exercises.

• **Restore strength**
  Eversion is especially important.

• **Restore proprioception**
  Proprioception training should begin as soon as pain allows during the rehabilitation programme.

• **Return to functional activity**

• **Physical therapy + kinesio taping**

• **To protect the joint – sports equipment- orthosis if it’s necessary**

• **Bemer, laser, ultrasound and electrotherapy - in some cases useful treatments**
Treatment and rehabilitation - experiences

Collagen injection

shooting **6-10 times**! Locally ampul of specific of body regions

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Achilles Tendinopathy – Achilles Tendon Injuries

• Achilles tendinopathy is a condition that causes **pain, swelling and stiffness of the Achilles tendon**. It is thought to be caused by repeated tiny injuries (known as microtrauma) to the Achilles tendon. After each injury, the tendon does not heal completely, as should normally happen. This means that over time, damage to the Achilles tendon builds up and Achilles tendinopathy can develop.
There are a number of things that may lead to these repeated tiny injuries to the Achilles tendon. For example:

- **Overuse of the Achilles tendon.** This can be a problem for people who run regularly. (Achilles tendinopathy can also be a problem for dancers and for people who play a lot of tennis or other sports that involve jumping.)
- Training or exercising **wearing inappropriate footwear.**
- Having poor training or exercising techniques - for example, **a poor running technique.**
- Making a **change to your training programme** - for example, rapidly increasing the intensity of your training and how often you train.
- **Training or exercising on hard or sloped surfaces.**
Grades of Tendon Strains

Strained Achilles Tendon
The 3 Different Grades of Tendon Strains

- Grade 1: Stretching, Minor Tear
- Grade 2: Partial Tear
- Grade 3: Ruptured

Calcaneus (heel bone)
Achilles Tendon Injuries

Location of Achilles Tendon Injuries

- Tennis Leg – a rupture between the Achilles Tendon and the Gastrocnemius
- Achilles Tendinosis, Achilles Tendonitis, Achilles Tenosynovitis, Achilles Tendon Rupture and medicine side effects are most often felt an inch or two above the heel.
- Insertional Achilles Tendinosis, Insertional Achilles Tendonitis, and Insertional Achilles Tenosynovitis occur where the Achilles Tendon and heel connect
- Achilles Tendon Laceration or Crushing could occur anywhere along the Achilles Tendon
Achilles Tendon Injuries

Differential Diagnosis:
1. Os trigonum syndrome
2. Peroneal tendon diseases
3. Tenosynovitis of plantar flexors
4. Stress fractures in the hindfoot
5. Accessory soleus muscle myofascial syndrome
6. Tumors (Achilles tendon xanthoma)
7. Bursitis
8. Sural neuroma

Complications:
Tendon rupture

Risk factors for Achilles Tendon Rupture:
1. Repeated microtraumas
2. Localized thickening of the tendon
3. Inflammation
4. Alterations in collagen metabolism

Risk factors for Achilles Tendonitis:
1. Localized thickening of the tendon
2. Inflammation
3. Alterations in collagen metabolism

Prevention:
1. Strengthening exercises
2. Preventing microtraumas
3. Maintaining optimal weight

References:
Achilles Tendinopathy- treatment methods

Non-operative treatment methods

• Eccentric musculotendinous training
• Extracorporeal shock wave therapy
• Intratendinous injection is contraindicated because of the catabolic effects
• NSAID?
• Electrophysical agents
• Sclerosing injections?
• Platelet reach plasma treatment?

Surgical treatment

• Open surgery for Achilles tendinopathy has shown that the outcomes are better for those tendons without a focal lesion compared with those with a focal area of tendinopathy.6
Treatment methods II.- experiences

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Collateral Ligaments Injury of the Knee
Knee Sprain

The collateral ligaments control the sideways motion of your knee and brace it against unusual movement.

- Because the knee joint relies just on these ligaments and surrounding muscles for stability, it is easily injured. Any direct contact to the knee or hard muscle contraction — such as changing direction rapidly while running — can injure a knee ligament.

- The MCL is injured more often than the LCL. Due to the more complex anatomy of the outside of the knee, if you injure your LCL, you usually injure other structures in the joint, as well.
Cause of the injuries

• **Injuries** to the collateral ligaments are usually caused by a force that pushes the knee sideways. These are often contact injuries, but not always.

• **Medial collateral ligament tears** often occur as a result of a direct blow to the outside of the knee. This pushes the knee inwards (toward the other knee).

• **Blows to the inside of the knee** that push the knee outwards may injure the lateral collateral ligament.
Symptoms

- **Pain** at the sides of your knee. If there is an MCL injury, the pain is on the inside of the knee; an LCL injury may cause pain on the outside of the knee.
- **Swelling** over the site of the injury.
- **Instability** — the feeling that your knee is giving way.
Nonsurgical Treatment

• **Ice.** Icing your injury is important in the healing process.
• **Bracing.** Your knee must be protected from the same sideways force that caused the injury.
• Most isolated collateral ligament injuries can be successfully treated without surgery.
• **Return to functional activity**
• **Physical therapy** (strengthening exercises) + **kinesio taping**
• **Bemer, laser, ultrasound and electrotherapy** - in some cases useful treatments
Nonsurgical Treatment- Experiences

Collagen injection

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What are muscle strains?

• A muscle strain, or pulled muscle, **occurs when your muscle is overstretched or torn.** This usually occurs as a result of fatigue, overuse, or improper use of a muscle. Strains can happen in any muscle, but they’re most common in your lower back, neck, shoulder, and hamstring.
Symptoms of muscle strains

You’ll usually feel a muscle strain as it occurs. Symptoms include:

• sudden onset of pain
• soreness
• limited range of movement
• bruising or discoloration
• swelling
• a "knotted-up" feeling
• muscle spasms
• stiffness
• weakness

• In a **mild strain**, a torn muscle may feel slightly stiff but still flexible enough for use. A **severe muscle strain** is when the muscle is severely torn. This results in pain and very limited movement.

• The symptoms of mild-to-moderate muscle strains usually go away within a few weeks. More severe strains may take months to heal.
Causes of muscle strains

- **An acute muscle strain** is when your muscle **tears suddenly and unexpectedly**. Such tears can occur either from injuries or trauma. This can be due to:
  - not warming up properly before physical activity
  - poor flexibility
  - poor conditioning
  - overexertion and fatigue
- **Chronic muscle strains** are the result of **repetitive movement**.
Lower limb - Overview of Different Location of Muscle Strains

- **Calf muscle strains**
- **Hamstring pulls**

The hamstrings (posterior thigh muscles) are made up of 3 long muscles. The lateral hamstring is the biceps femoris and the medial hamstrings are the semitendinosus and the semimembranosus.
Treatment

• Rest- but don’t rest your muscle for too long!
• Ice
• Compression
• Elevation
• Improving microcirculation
• Return to functional activity

Physical therapy (strengthening exercises) + kinesio taping
• Bemer, laser, ultrasound and electrotherapy - in some cases useful treatments
Treatment

• Oral medications can mask the pain but do not aid in the healing of a muscle injury. **Anti-inflammatories and pain killers can cause muscle related injuries to worsen**
Treatment- Experiences

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Conclusion-advantages of collagen

- effective and causal therapy
- easy and safe to apply
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- large area of indication
- analyzed dopingfree product
„What time and for what reason“ to apply collagen treatment?

- **Collagen therapy** seems to be very important part of the modern healing in musculoskeletal disorders. It could be necessary in the near future to create a precise guideline „what time and for what reason“ to apply collagen treatment.
Thank you for your attention!