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INJECTABLE GUNA COLLAGEN MEDICAL DEVICES IN FUNCTIONAL RECOVERY FROM SPORT TRAUMATOLOGY. CASE REPORTS

SUMMARY

Low back pain is one of the most frequent diseases of our time and, due to the multiplicity of causative factors and concomitant causes, it represents one of the most controversial issues of medicine; numerous studies have shown that 60-80% of humans are affected at least once in their lifetime by a low back pain episode that may recur in 90% of cases.

– The most affected age group is the one ranging between 30 and 50 years. Nevertheless, as it is well known in Sports Medicine, a substantial percentage affects individuals under 20. The most frequent occurrence in Sports Medicine is represented by prevailing irritative forms of the *annulus fibrosus* whose etiology should be sought in the particular biomechanics of the lumbar spine.
If analysed carefully, it can be understood that the intervertebral disc can be damaged more easily not by compressive forces, but by the combined stress of lateral bend and rotation, because the lumbar vertebrae have no anatomic features to bear this kind of stress, which is typical of the athletic gestures. The force and speed that characterize sports activities may thus damage the *annulus fibrosus* formed by concentric layers of collagen fibers type 1, oriented at an angle of 30° on a horizontal axis and at an angle of 120° with the adjacent fibers. As the disc damage is represented by the collagen fibers lesion of the *annulus fibrosus*, the possibility of using Guna Collagen Medical Devices – which are specific, injectable, and replace the lack of collagen – gives an innovative and practical tool for the prevention, repair and treatment of the aging process of the intra-articular and periarticular structures as well as supporting the neighbouring mesodermal tissues.

In this article are presented two clinical cases from the author's outpatient practice, as examples of treatment protocols.

KEY WORDS

ATHLETE, DISC LESION, VERTEBRAL BIOMECHANICS, OSTEOPATHY, GUNA COLLAGEN MEDICAL DEVICES

In the whole population backache is, after common cold, the most frequent human disease.
Almost 80% of the population is destined to experience low back pain during the course of their lives.
Most of the scientific studies on this topic show an annual presence of symptoms in 50% of adults in their working age. 15-20% of these people use medical or pharmacological treatments.

Low back pain equally affects men and women and the onset is more frequent between 30 and 50 years of age, but, by virtue of the socio-cultural changes that are characterizing the industrialized countries, the onset tends to affect people in a younger age.
Backache involves high individual and social costs in terms of imaging techniques and treatments, reduced productivity and decreased ability to perform activities of daily living.
For people under 45 years of age, low back pain and neck pain are the most common cause of disability.
Despite technology and information have improved working conditions, and although Medicine has greatly developed diagnostic and therapeutic opportunities, the inability to work caused by back pain is constantly increasing.
Therefore, we can consider that Medicine, especially preventive Medicine, has not taken appropriate action on this issue.

Medical science had thought that mechanization could greatly reduce the chances of damaging the osteoarticular structure, especially the spine.
Nevertheless, results have refuted these expectations.
Medical science has then concluded that the problem could lie in reduced muscle strength, and therefore athletes, with their athleticism, could run less risk of being affected by spinal diseases.
But the number of cases in the field of sports medicine is not different.
In fact, a large percentage of cases involve subjects aged under 20 years (Candela *and* Dragoni, 1998).

So, the answer of medical doctors to the question *"What can I do for my back pain?"* has been for a long time *"perform physical activity"*, or *"go swimming"*.

The results, however, have not been encouraging, so that in doubtful cases we continue to recommend "rest" to athletes and "physical activity" to sedentary people.

– Therefore, one wonders why both athletes and sedentary people may suffer from low back pain.

Actually, sport has contradictory effects on the lumbar spine: it strengthens the muscles with protective effect on discs structures, but the microtrauma caused by repetitive stress typical of sports activities can be harmful (Danowki and Chanussot, 1998).

The sports that most often involve lumbar spine problems are: **gymnastics**, **football**, **canoeing**, **rowing**, **wrestling**, **weightlifting**, **tennis** and **golf**.
– Reading an NMR which shows essentially the presence of disc protrusions is the most frequent event in Sports Medicine.
This confirms the hypothesis based on clinical experience that common irritation of *annulus fibrosus*, muscle groups, tendons and ligaments of the low back pain due to sport is a sign of a functional disorder of the lumbar spine.

The arthritic degenerative forms or herniated disc are much more rare (Candela *and* Dragoni, 1998).
The most common source of low back pain due to sport is pain-disc lesion that affects L4-L5 or L5-S1.
We can distinguish:
1) herniated low back pain, in which the disc lesion is directly responsible for pain;
2) low back pain due to segmental instability, in which the disc degeneration and the consequent instability turn out to be the cause.
In this case, the posterior joints and the interspinous ligament are also involved and become a further source of pain, as they are highly innervated structures.

To understand the cause of the degeneration of the lumbar intervertebral disc we should recall some aspects of spinal biomechanics. An important biomechanical property of the spine is viscoelasticity, which determines a continuous deformation of the tissues of this structure, provided that the applied force is slow and progressive (Bersi, 1995).
This situation is rarely found in sports where, by definition, gestures are always the ultimate expression of joint speed and mobility.

Schematically, from a biomechanical point of view, there are two different tissues in the spine: bone and soft tissue structures (disc, ligaments, muscles).
The bone strength capacities are more important under compression (load resistance) (Bersi, 1995) **(Figure 1)**.
The soft tissue resistance, as the complex disc (*nucleus pulposus* + *annulus fibrosus* + ligaments) are more important under strain (resistance to stretching) (Bersi, 1995) **(Figure 1)**.
In order to fulfill these functions the intervertebral disc has a very complex functional anatomy: the *annulus fibrosus* consists of collagen type I fibers oriented at 30 degrees on a horizontal axis and 120° with respect to the neighboring fibers **(Figure 2)**.
Such fibers are capable of withstanding only the tension forces (Antoniou *et* Al., 1996; Hayes *et* Al., 2001).
The *nucleus pulposus* is less rich in collagen fibers (type II), but consists mainly of proteoglycans (hydrophilic) (Adams *et* Al., 1977; Hayes *et* Al., 2001; Cs-Szabo *et* Al., 2002; Sztrolovics *et* Al., 2002): the whole structure appears as an incompressible gel.

The risks of stress of the *annulus fibrosus* under tension beyond the physiological limits are much higher in combined stresses during flexion-rotation, and these are the most common stresses in sports gestures that, moreover, are made at very high speeds **(Figure 3)**.
These movements cannot be separated or governed by specific laws described by Fryette (Harrison H. Fryette, 1878-1960) as follows:

First Law: when a vertebra or a vertebral segment is in easy flexion (or neutral bending), any lateral inclination automatically results in an opposite rotation of the vertebral bodies, towards the convexity.

Second Law: when a vertebra is in forced flexion or extension, to make a lateral flexion, is obliged to first make a rotation on the same side, towards the concavity.
The rotation movements, which are of

course unavoidable, jeopardize the integrity of the lumbar spine.
We usually consider the lumbar vertebrae as extremely open in rotations, because their structures **do not** hinder movement, as it happens with the dorsal vertebrae.
The facet joints of the lumbar vertebrae ensure that the rotational movement takes place around an axis that does not correspond to the center of the vertebral end plates, but which is located at the base of the spinous process (Kapandji, 2002) (Figure 4).

Therefore, when a vertebra rotates upon another vertebra, this movement is necessarily accompanied by a lateral sliding of the vertebral body stressed in torsion. This results in a tensioning of the *annulus fibrosus* fibers that, due to typically extreme sports movements, may overcome the resistance of the structure concerned. All this may result in a progressive, anatomical damage due to failure of the collagen fibers.

We should emphasize that, in outpatient cases, pain or lumbar disk lesions are almost always localized in the vertebrae L4-L5 and L5-S1. This is conceivably due to the fact that L4 and L5 are the only two vertebrae to be connected to the pelvis by the ilio-lumbar ligament (Figure 5), and that may be affected by stresses radiating from the lower limbs that, in case of stiffness or of strong stresses, as it happens in sports gestures,

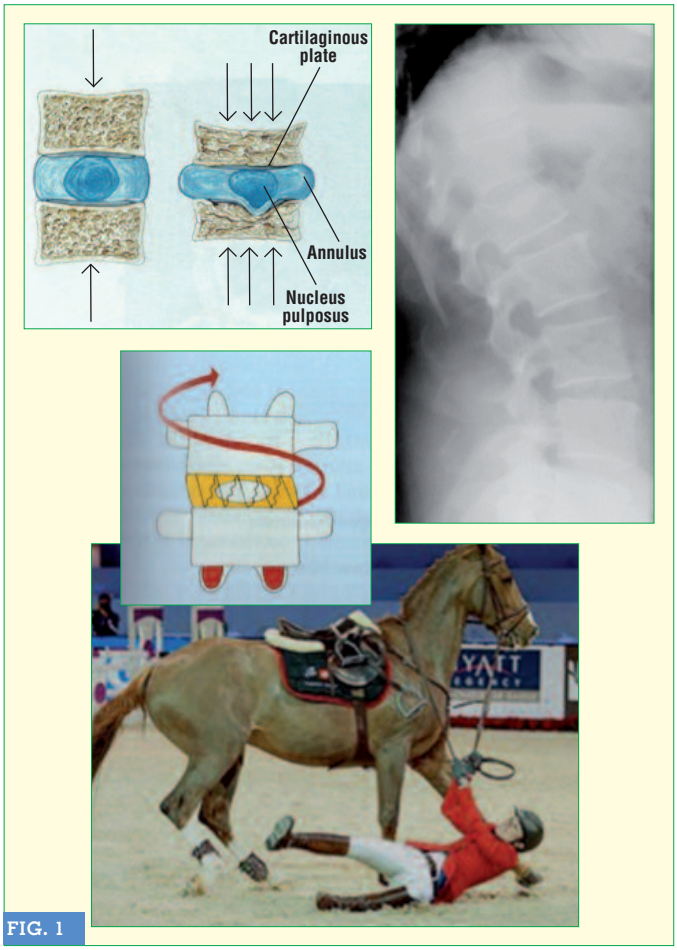


FIG. 1

FIG. 2

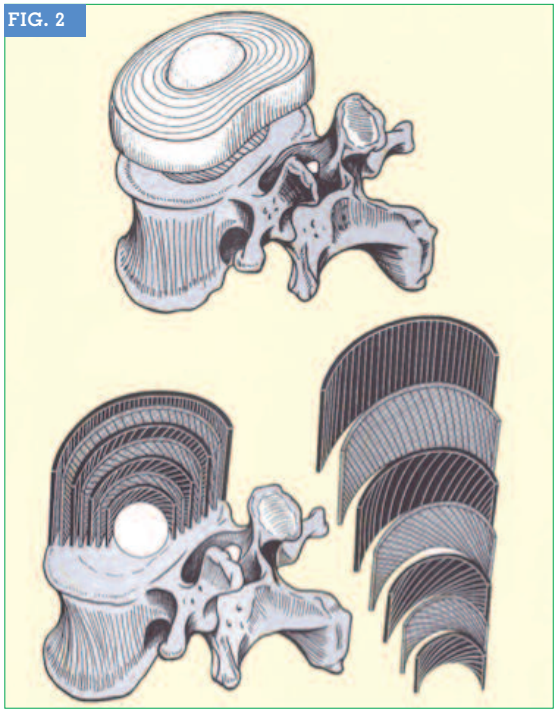
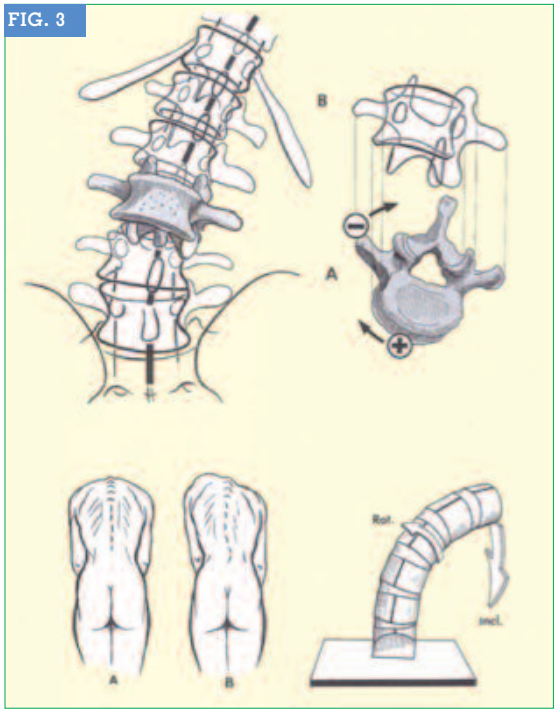


FIG. 3



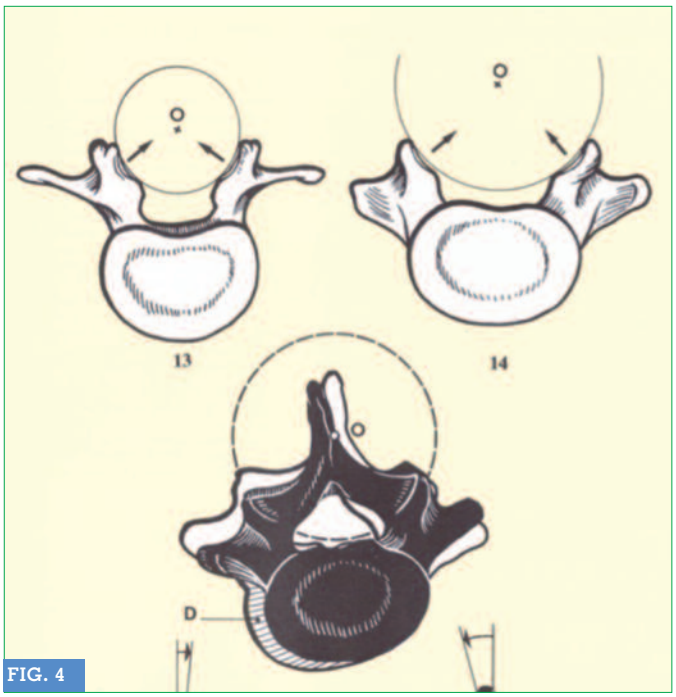


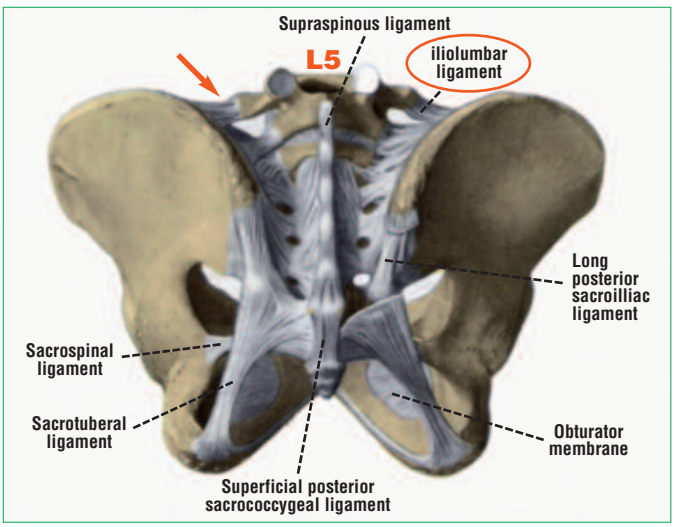
FIG. 4

can lead the spinal rotational movement beyond the physiological limits.
So, contrary to common opinion, the disc damage cannot be primarily ascribed to compressive stresses, such as those of the bounces of a race, but to a number of causes, such as:
– strong tractions that the muscles of the lower limbs exert on the pelvis;
– pelvis that causes rotation of the vertebral bodies of L4 and L5 through the ileo-lumbar ligaments;
– joint facets of the lumbar vertebrae that do not facilitate rotation;
– translation of the vertebral body.

This is the series of events that may induce the progressive lesion of the collagen fibers of the *annulus fibrosus* leading to the herniation of the *nucleus pulposus*.
The disc damage is due to a lesion of the *annulus fibrosus* collagen fibers.
Therefore, the availability in the current medical practice of **Guna Collagen Medical Devices** – specific injectable devices that replace the collagen degradation – can be seen as an innovative and practical tool for prevention, repair and treatment of the aging process of **intra-articular** and **periarticular structures**, and of the neighboring mesodermal support tissues.

FIG. 5

From Netter F.H. – Atlas of human anatomy. EDRA Ed. 2014 (see References).



– In my personal medical practice of Sports Medicine and Osteopathy, I daily assist athletes affected by bone, joint and myofascial disorders, using manual medicine with excellent results.
– The combined treatment with Collagen MDs has speeded up the healing process, further reducing the athlete's recovery time, and has ensured a more permanent damage repair, especially in cases of tendency to relapses.

CASE REPORTS

43 professional athletes were treated between January 2014 and December 2015. Amateur athletes were excluded.
– All athletes were treated for acute low back pain (or relapses) resulting from pain or disc lesion without disc herniation diagnosed via NMR.
The athletes, aged between 19 and 32 years, were practicing the following sports: Karate (**2**), Fencing (**3**), Rowing (**5**), Triathlon (**5**), Horse riding, Show Jumping (**6**), Volleyball (**6**), Athletics, Race (**7**) and Football (**9**).
Treatment: manual + injectable therapy with **Guna MD-Lumbar** + **Guna MD-Muscle** and **Guna MD-Matrix**, 4-5 cm lateral to the spinous processes of L4, L5, S1 with 30G, 13mm needle.
– We hereby present two emblematic examples of the treatment protocol, using the rapid return to sports as an indicator of treatment efficacy.

CLINICAL CASE 1

Female, 26 years old, practicing riding, show jumping discipline, professional athlete.

– In June 2014 she fell during a jump, because of a technical error. This athlete experienced strong back pain at that time, which worsened some days later, until discontinuance of sports activity.
NMR negative for herniated discs.
Treated with manual therapy: muscle stretching for hamstrings, intra and external rotators, iliopsoas; manipulations of sacroiliac joints and lower back.

She went back to training after only two sessions of manual therapy, because of fear of injections. A slight discomfort still persisted after one month.
The athlete understood the necessity of an injection treatment with Guna Collagen Medical Devices with the following protocol: 2 sessions/week for 2 weeks; then 1 session/week for 6 weeks.
MD-Lumbar + MD-Matrix, 4-5 cm lateral to the spinous processes L4, L5, S1 with 30G 13 mm needle. After 3 sessions, full remission of pain. Anyway, the patient completed the course of therapy.

Comments
Certainly, at the beginning, the fact that it was impossible to fully discontinue physical activity (you have to train the horse, especially) has not facilitated an optimal repair of the lesion. The locoregional injection of **MD-Lumbar** (specific for the skeletal structure) and **MD-Matrix** (specific for the extracellular matrix), has probably supported the deposition of neo-synthesized collagen fibers in the damaged region, helping the patient to fully recover.

CLINICAL CASE 2

Male, 28 year old, professional football player, striker.

– In September 2014 acute lumbar joint block after an athletic training session in the gym, which caused immediate discontinuation of sport activity.
The athlete was treated with NSAIDs for 5 days by the team doctor. Then he was treated by the team osteopath for three times + 8 Tecar therapy sessions.
The football player resumed training sessions after 15 days, but did not completely recover. After new worsening symptoms, the athlete came to my clinical practice.
Results of NMR: *"Slight disk protrusion in the back median area between L4-L5 and L5-S1. There are no herniated disks"*.
Treatment with manual therapy: muscle stretching for hamstrings, intra and external rotator muscles of the hip, iliopsoas + injection treatment with Collagen as follows: 3 sessions/week for 1 week; 2 sessions/week for 2 weeks; 1 session/week for 5 weeks.
The treatment included **Guna MD-Lumbar + Guna MD-Matrix + Guna MD-Muscle** (in the long run analgesic muscle contractures appear); 4-5 cm lateral to the spinous processes of L4, L5, S1 with 30G 13mm needle.
After 3 sessions the patient has gradually resumed his training sessions; after 7 sessions (3 weeks) he played a full game. Some discomfort persisted in the movements early in the morning until session n. 9.

Comments
This patient showed marked stiffness of the muscles of the posterior kinetic chain of the lower limbs.
So, the only spinal manipulative therapy could not remove the actual triggering cause, resulting in the worsening of the lesion.
The stretching treatment was useful to restore a more correct spinal biomechanics, and the injection therapy with MD-Lumbar (specific for the skeletal structure), MD-Matrix (specific for the extracellular matrix) and MD-Muscle (specific for the muscle tissues) allowed to neutralize the inflammatory-degenerative disk overlap. ■

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