Frozen Shoulder:
Cause, Diagnostics, SCENAR Treatment.

The Frozen Shoulder Syndrome is a clinical phenomenon that involves pain and limited mobility in the shoulder joint caused by any of the pathologies.

GENERAL INFORMATION

Risk factors:
• age;
• injuries or surgical interventions in the shoulder joint;
• diabetes;
• cardiovascular disease;
• cerebrovascular disease;
• endocrine pathology.

Most often, the Frozen Shoulder syndrome is characterized by the development of the degenerative inflammatory changes in the joint-ligamentous apparatus of the shoulder. On the radiograph, it looks like arthrosis and calcium deposits in the lateral parts of the joint capsule. Usually the Frozen Shoulder is a chronic, long-term process, but it can develop suddenly, acutely and without visible provoking factors.

Clinically, the Frozen Shoulder is characterized by the shoulder pain with the radiation to the arm and limitation of a range of motion in the shoulder joint. The motion limitation is more pronounced during bending, extension and external rotation, less - at internal rotation. The movements in the neck are completely the same but can somewhat increase the pain. With the abduction of the arm, the pain intensifies sharply, the muscles of the shoulder girdle tighten. Due to contracture, shoulder abduction is limited: the shoulder is “riveted” to the shoulder blade, and only a small abduction is possible. Forward and backward movements are relatively free. Reflex and sensitive disorders in the shoulder girdle are not detected.

Pain in the Frozen Shoulder is caused by:

• pathology of the rotator cuff of the shoulder,
• adhesive capsulitis;
• myofascial pain syndrome;
• a combination of these conditions.

Therefore, the therapy should be comprehensive and include not only the treatment of the joint, but also the therapy of the soft tissues of the shoulder girdle.

DIAGNOSTICS

The shoulder joint is a spherical joint with a greater mobility than any other joint. The synovial bursa/joint sac is weak and thin. Joint stability depends on the muscles and ligaments of the rotator cuff of the shoulder.

After collecting complaints, you need to examine the joints. First, the active (performed by the patient) movements are determined. Each of the individual movements in the shoulder joint is examined, comparing one side to another. The initial position of the patient is standing with a straightened torso. You should ask the patient to bring straightened arms sideways up (abduction), back (extension), forward-up (bending). You can evaluate the range of motion and its limitation according to the table.

Motion	Norm/ Regular degree ^{o}	Limited movement		
		insignificant	moderate	significant
bending	180^{o}	115^{o}	100^{o}	80^{o}
extension	40^{o}	30^{o}	20^{o}	15^{o}
abduction	180^{o}	115	100^{o}	80^{o}

To better detect the abnormalities in the shoulder joint and determine the state of its rotator cuff ask the patient to perform two complex active movements:

1) put/throw hands behind the head (abduction, external rotation and flexion in the shoulder joint, as well as the function of the supraspinatus, infraspinatus, and small round muscle are evaluated);
2) put hands behind the back (internal rotation, abduction and extension in the shoulder joint, as well as the function of the subscapularis muscle are evaluated).

If the patient performs both movements, then the shoulder joint and the rotator cuff of the shoulder are normal. A painful sensation with isometric tension with overcoming resistance in the abduction (with the arm fully extended) will indicate damage to the supraspinatus muscle, painful tension with external rotation will indicate damage to the supraspinatus.

After identifying the volume of active movements, you should determine the volume of passive movements – always performed by the doctor/ practitioner on the patient's relaxed arm. For passive movements of the abnormal/ damaged joint capsule and the frozen shoulders, a joint model is as follows: first, external rotation is limited, then abduction, and lastly internal rotation.

Evaluation of passive external rotation:

• starting/ zero position - the patient is sitting, the doctor is behind;
• the patient's arms are brought up, the elbows are bent at a right angle and are directed forward;
• at the same time, the doctor turns both forearms outward making sure that the elbow remains pressed to the body;
• to evaluate the internal rotation, the doctor pulls the patient's thumbs behind his back.

After assessing mobility disorders, the joints and the muscles of the shoulder girdle should be palpated on both sides, their symmetry should be assessed, and the muscle tightening zones and soreness should be identified.

Pathology of the rotator cuff of the shoulder is the most common cause of pain in the shoulder joint. More often, men over 40 suffer from that, usually the dominant arm is affected.

Characteristics:

- local pain in the deltoid muscle, under the acromion and near the large tubercle of the humerus;
- slight irradiation of pain, aggravation during movement, limitation of the active shoulder abduction and external rotation with the same passive movements;
- palpation of a large tubercle is painful, the crepitus is detected and swollen.

Adhesive capsulitis is a chronically occurring fibrotic inflammation of the capsule of the shoulder joint. This variant of the Frozen Shoulder is considered idiopathic, the causes are unclear. It occurs in women over 45 years old, does not depend on the intensity of physical activity. The damage is usually one-sided. The pain is constant, aching, localized in the shoulder joint and does not radiate.

Characteristics:

- increased pain at rest and at night and a slight weakening when moving;
- noticeable stiffness at the shoulder joint in the mornings.
- swelling around the joint;
- the affected shoulder is raised, the muscles of the shoulder girdle are shortened, slightly atrophic, characterized by increased fatigue;
- the volume of active and passive movements in the joint is uniformly limited in all directions and does not increase when leaning forward.

Myofascial syndrome is another common cause of the Frozen Shoulder.

- The main sign of myofascial pain syndrome is the presence of acute intense pain that occurs when pressure is applied to the trigger point.
- Myofascial trigger points can be located in muscles, fascia or tendons, and they are the cause of this type of pain.
- In the Frozen Shoulder, trigger points are most often detected in the subscapularis muscle, then in the pectoralis major and the minor muscles, less often in other areas.
- When palpating, the trigger point is felt as a compaction or cord, the pressure on which provokes sharp local pain and radiating pains of different localization.
- Each trigger point has its own zones of reflected pain, which is usually dull, aching, deep and may be accompanied by numbness.

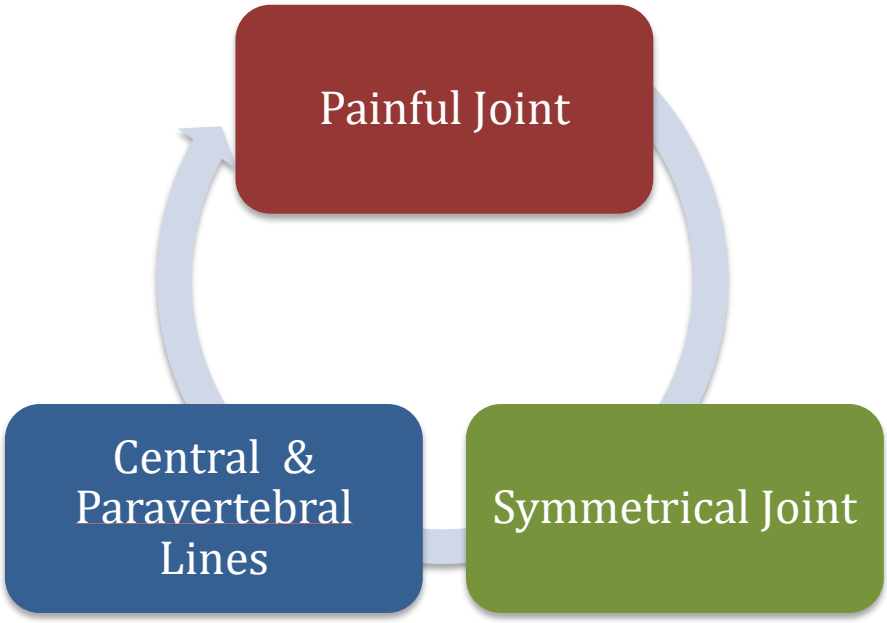
THERAPY

General principles:

- It is necessary to combine SCENAR therapy with physical load on the shoulder joint.
- SCENAR should be used after physical load on the joint.
- The procedure should be cyclical and consist of several iterations of alternating SCENAR and physical activity.
- Treatment zones should include not only the shoulder joint itself, but also the muscles of the shoulder girdle.
- With an unilateral damage, a symmetrical joint is always treated.
- To improve the innervation and blood supply to the joint, treat the spine in the innervation segment of the shoulder joint.
- Optimal combination of professional procedures performed by the therapist with home therapy increases the effectiveness of treatment.
- If there are medications prescribed by a doctor, they should be used as prescribed.

Treatment Plan

The general treatment regimen is simple and consists of three stages. The first stage - treatment of a diseased/ damaged joint - should take 60 - 70% of the entire procedure



The real treatment plan is somewhat more complicated, as it consists of an alternating treatment with the physical load on the joint.

1) Clarification of the local complaints
2) Physical examination
3) Therapy of the local complaints
4) Functional test
5) Therapy Dynamics Complaints
6) Functional test
7) Symmetry therapy
8) Functional test
9) Spinal Segment Therapy
10) Functional test.

Position during the treatment

Sitting	Lying on the stomach/ prone position
• joint points; • joint/ articular capsule; • symmetrical joint; • spine; • shoulder muscles	• scapula muscles; • trapezius muscle • neck muscles

Joint therapy steps

Therapy of the shoulder joint is performed according to the following scheme:

1) Work on the treatment points of the joints from the affected/ damaged side;
2) Treat the joint capsule from the affected/ damaged side;
3) Symmetrical joint therapy.

Joint points

Therapy of the shoulder joint is performed at the treatment points. It is in the middle - the classic Dr Gorfinkel point – a finges below the acromion. On the sides of the anterior and posterior projections of the joint space on the edge of the deltoid muscle, the most optimal therapy is performed with a pawn electrode. In the absence of a pawn electrode, the built-in electrode can be used, but this extends the treatment time.

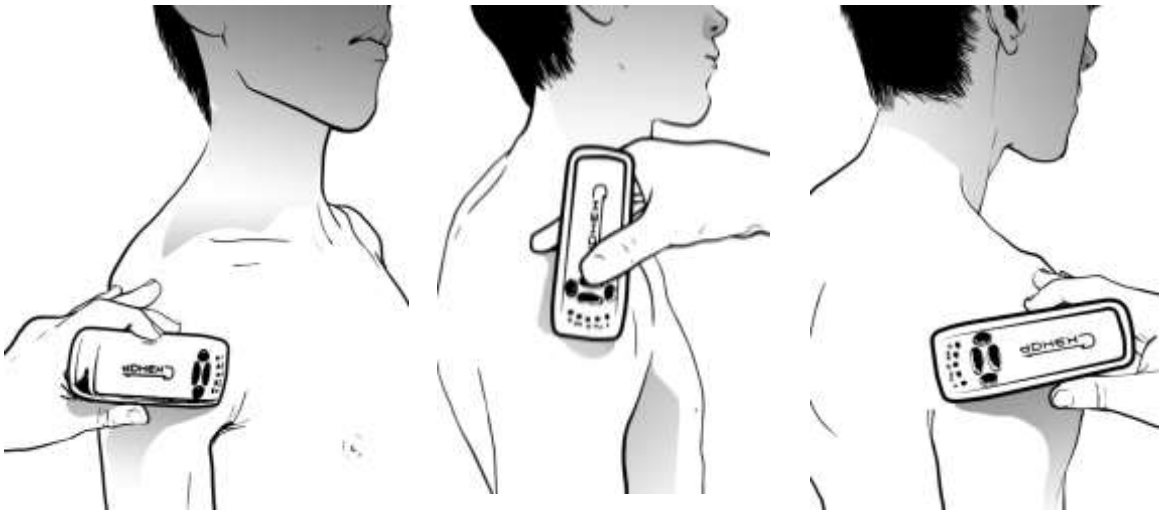
To select a joint treatment regimen, determine the level of soreness in it under stress.

Three states can be distinguished:

1) Acute pain in the joint under the load – "**JointTraum**" preset or **F=180Hz+Int=7**;
2) Pain under the load is not acute but is present – "**JointAcute**" preset or **FM+Int=8**
3) Under the load, the joint is painless but stiff – "**JointChron**" preset **or FM+ Int=5+Gap=30**

Therapy with Spaced Electrodes

Therapy with Built-In Electrode



Joint capsule therapy

The treatment is performed by slow movements in the projection of the joint space of the shoulder joint. Treat on the front, side and back surfaces of the shoulder joint. Do NOT treat the armpit!

Particular attention should be paid to the areas of stickiness. In such areas, stop the movement of the device and stay for 1 - 2 minutes. If during this additional treatment the stickiness doesn't go away, set the "**HiFM"** preset or **F120 Hz + Int= 5** and work on the area of stickiness until it is gone. The treatment time of the joint capsule is 3-5 minutes.

Treatment of the soft tissues

The main goal is the trigger points and the muscular-ligamentous apparatus of the shoulder girdle. The choice of the treatment regimen depends on the initial direct study, during which the examination of the muscular apparatus, its symmetry, soreness, and muscle consistency was carried out. The trigger points and their activity are evaluated.

The treatment begins with the treatment of the trigger points. To do so, use the "**Trigger**" preset or **F20Hz + Int = 7 + Gap = 75 + Dmp = Var**. If several painful trigger points are found, treat the more peripheral ones first, then the more central ones. The treatment time for each trigger point is 2-3 minutes.

The general direction/ vector of the treatment for the muscular system of the shoulder girdle is from the periphery to the center. First, the shoulder muscles are treated, then the muscles of the scapula and the trapezius muscle, and at the end - the neck muscles.

The muscle treatment is performed with a spaced pawn electrode. It is possible to treat the muscles of the shoulder girdle with the conductive gloves.

The deep treatment of the muscles of the shoulder (biceps, triceps, deltoid) is performed only on one side - from the side of the damage/ soreness. The symmetrical zone is treated in the "**Symmetry"** preset. Treat the muscles of the scapula also from the side of the damage/ soreness. The symmetrical zone is treated in the "**Symmetry**" preset. Treat the trapezius and neck muscles symmetrically.

We can distinguish 3 muscle conditions detected by the palpation during the initial examination, which allows you to choose the necessary treatment regimen.

1. The muscle apparatus without significant local asymmetries in the form of a compaction/ hardening and muscle soreness – "**Myo Uni**" preset or **F 60Hz + Int = 5**.
2. Locally tightened muscles. The tightened muscles are treated with the "**MyoDeep**" preset or **F 20Hz + Int = 7**, the rest – "**Myo Uni**" preset or **F 60Hz + Int = 5**.
3. Obviously painful muscles by palpation are treated with "**LoFM**" preset or **F 30Hz + Int -5 + Gap -20**,
   the rest – "**Myo Uni**" preset or **F60Hz + Int = 5.**

The treatment time of the muscles should not exceed 10 minutes.

Symmetrical Joint Therapy

To treat the symmetry, use a low **F = 60 Hz**, with Int = 3, or use the "**Symmetry**" preset.

It is also convenient to use Diagnostics 4 (D-4) to search for the most active points in the treated area.

If the projection area is not large, do not search for the active points.

The treatment time of the symmetrical zone is not more than 5 minutes.

Spine Therapy

The general treatment plan:

- Treatment of the spinous processes (central line)
- Paravertebral lines with spaced electrodes (pawns)
- Treatment begins on the vertebra above the area of interest
- Treatment ends at the vertebra below the affected area

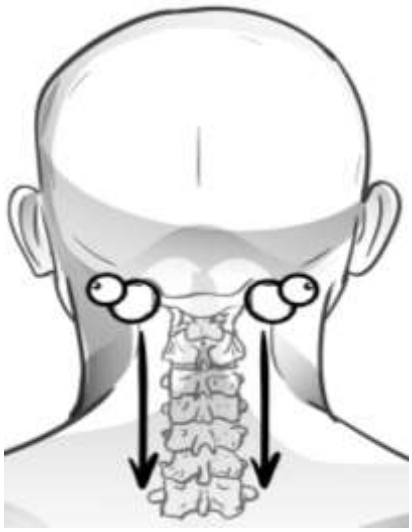
Use the built-in electrode to treat the spinous processes. The treatment time is 20-30 seconds per vertebra. The treatment direction/ vector is from top to bottom. The electrode is pressed firmly against the

vertebra.

The paravertebrals are treated using a spaced electrode. The built-in electrode can be also used; however, this increases the treatment time. The treatment direction/ vector is from top to bottom.

On both the central line and the paravertebrals additionally treat the vertebra above the affected zone and the vertebra below the affected zone.

Paravertebral line therapy	Therapy on the projection of the spinous processes (central line)
• **"PeriphPain**" preset or • F60 Hz • Int= 5 • Pawn electrode or gloves • Time 20-30 seconds per a vertebra	• **"CenterPain**" preset or • F90 Hz • Int= 3 • Built-in electrode • Time 20-30 seconds per a vertebra



Treatment setting:

Purpose	Preset	Manual Settings					
		F	***Int***	***Gap***	***FM***	***AM***	***Dmp***
Joint points Acute Pain	**JointTraum**	180	7	10	Off	Off	Off
Joint points Chronic Pain	**JointAcute**	-	8	10	FM	Off	Sc2
Joint points Stiffness without the pain	**JointChron**	-	5	30	FM	Off	Off
Joint capsule	**JointCaps**	-	-	-	Sw1	Off	Off
Stickiness	**HiFM**	120	5	10	Off	Off	Var
Trigger points	**Trigger**	20	7	75	Off	Off	Var
General Therapy of Soft Tissues	**Myo Uni**	60	5	10	Off	Off	Off
Tight/ hardened Muscles	**MyoDeep**	20	7	10	Off	Off	Off
Painful muscles	**LoFM**	30	5	20	Off	Off	Off
Symmetrical Joint Therapy	**Symmetry**	60	3	10			
Central Spinal Line	**CentrPain**	90	3	10	Off	Off	Off
Paravertebral Line	**PariphPain**	60	5	10	Off	Off	Off

*Our suggestion as for the best choice of the device is RITMSCENAR® v2. It is the most advanced and multifunctional model, incorporating all available functions and signal variables developed up to date in SCENAR® technology. With its 32 pre-designed setting combinations, the practitioner can start using the device straight out of the box and provide effective treatment with minimal training. Two Dose modes and three screening modes are available for identifying optimal treatment zones and monitoring the treatment process.

SCENAR® technology has been proven to provide quick and sustainable pain relief in a wide range of painful conditions, increased function and quicker rehabilitation.

**This article was prepared by Boris Kulizhskiy – leading RITM OKB ZAO physiologist and controlled physiotherapy specialist.