Department of Rehabilitation and Physical Therapy

Praski Hospital in Warsaw

Warszawa Al. Solidarności 67

Director Lech Wasilewski

Report

This report contains information on medical procedures performed on patients with musculoskeletal disorders. The method used was deep electromagnetic stimulation using SALUS-TALENT device. The procedures were performed on 27 patients of Department of Rehabilitation and Physical Therapy of Praski Hospital in Warsaw, Al. Solidarności 67.

Purpose of research:

- **improving health condition and musculoskeletal functions by using a new method of physical therapy, which is deep electromagnetic stimulation.**
- **verifying the effectiveness of deep electromagnetic stimulation on musculoskeletal disorders.**

Description of conducted experiment

Deep electromagnetic stimulation procedures were performed on patients with skeletomuscular pain disorders (as defined in ICD 10). The subjects were patients of Department of Rehabilitation and Physical Therapy of Praski Hospital in Warsaw in May and June of 2011. A total of 27 patients were selected, out of which 22 were female, 5 were male, with an average age of 56 (the youngest patient was 26, the oldest 67).

Patients were divided into 3 groups:

Group I **patients suffering from knee joint pain disorders, defined in ICD 10, M-17 as „knee joint osteoarthritis", presented on picture 1**

Group II **patients suffering from arm joint and upper limb pain disorders, defined in ICD10- M75 „painful shoulder syndrome", presented on picture 2**

Group III **patients suffering from skeletomuscular pain disorders, with different etiology and location, presented on picture 3**

All patients were informed of the purpose as well as the method of performing procedures and agreed to participate in the experiment.

Methods of performing procedures:

In order to obtain conclusive results, stimulating with deep magnetic field using Salus – Talent device was the only form of therapy.

Basing on the manufacturer's tips and recommendations, the procedure was performed on the location of the disorder in a distance of 1 cm or in a full contact with the skin. Parameters such as field strength or applicator's settings during the procedure were subject to patient's subjective opinion.

The number of procedures in one session was 10. The schedule of one session was as following: from 1st to 3rd procedures the time of one procedure was 5 minutes, while from 4th to 10th the time was 10 minutes. The doses used were consistent with factory settings. A1 Mode (3-15 Hz) was used on patients with knee joint osteoarthritis. A3 Mode (3 – 30 Hz) was used on patients with painful shoulder syndrome as well as skeletomuscular pain disorders with different etiology and location.

Ryc1. Patients diagnosed with „knee joint osteoarthritis" (ICD 10, M 17) gr. I that underwent the deep electromagnetic field stimulation procedure.

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No.	Patient's initials (1)	Sex F/M (2)	Age (3)	Diagnosis (4)	Applicator's location (5)	Used method (6)	Total number of procedures (7)
1.	**SZ**	**F**	**68**	Osteoarthritis of both knee joints	**Left knee joint**	**A1**	**10**
2.	**BE**	**F**	**74**	Osteoarthritis of both knee joints	**Left and right knee joint**	**A1**	**20**
3.	**DM**	**F**	**76**	Osteoarthritis of both knee joints	**Left and right knee joint**	**A1**	**20**
4.	**BK**	**F**	**64**	Osteoarthritis of both knee joints	**Left and right knee joint**	**A1**	**20**
5.	**SzZ**	**F**	**62**	Osteoarthritis of both knee joints	**Left and right knee joint**	**A1**	**20**
6.	**PH**	**F**	**66**	Osteoarthritis of both knee joints	**Left and right knee joint**	**A1**	**20**
7.	**OS**	**F**	**77**	Osteoarthritis of both knee joints	**Left and right knee joint**	**A1**	**20**
8.	**JS-W**	**F**	**71**	Osteoarthritis of both knee joints, damaged medial meniscus	**Left knee joint**	**A1**	**10**
9.	**KM**	**F**	**69**	Osteoarthritis of both knee joints	**Left and right knee joint**	**A1**	**20**
10.	**TA**	**M**	**62**	Osteoarthritis of right knee, damaged lateral meniscus.	**Right knee joint**	**A1**	**10**
11	**AK**	**F**	**47**	Osteoarthritis of right knee joint	**Right knee joint**	**A1**	**10**
12.	**WL**	**M**	**57**	Osteoarthritis of left knee, damaged lateral meniscus	**Lateral side of left knee**	**A1**	**8**

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Picture 2. Patients diagnosed with „painful shoulder syndrome" (ICD 10,M17) gr II that underwent the deep electromagnetic field stimulation procedure

No.	Patient's initials	Sex F/M	Age	Diagnosis	Applicator's location	Used method	Total number of procedures
1.	**KG**	**F**	**68**	Osteoarthritis of shoulder joint, damaged left shoulder rotator cuff.	pointed at rotator cuff	**M3**	**10**
2.	**OM**	**F**	**57**	Painful left shoulder syndrome with joint contracture, state after Colles fracture	Pointed at the ventral side of left shoulder joint	**M3**	**10**
3.	**LW**	**M**	**58**	Damaged right shoulder rotator cuff	pointed at the ventral side of right shoulder joint	**M3**	**10**
4.	**GK**	**F**	**57**	Painful right shoulder syndrome, with shoulder joint contracture, state after Colles fracture	pointed at the ventral side of right shoulder joint	**M3**	**10**
5.	**MJ**	**F**	**78**	Osteoarthritis of left shoulder, damaged rotator cuff	Pointed at rotator cuff	**M3**	**10**
6.	**KJ**	**M**	**42**	Osteoarthritis of left shoulder joint	Pointed at rotator cuff	**M3**	**10**
7.	**TE**	**F**	**63**	Osteoarthritis of right shoulder joint	Pointed at the dorsal side of theshoulder	**M3**	**10**
8.	**DSz**	**F**	**56**	Osteoarthritis of left shoulder joint	Pointed at the ventral side of theshoulder	**M3**	**8**
9.	**KT**	**F**	**54**	Painful right shoulder syndrome, with joint contracture, state after Colles fracture	Pointed at the dorsal side of theshoulder	**M3**	**7**

Picture 3. Patients diagnosed with skeletomuscular disorders of other etiology from group III that underwent the deep electromagnetic field stimulation procedure

No.	Patient's initials (1)	Sex F/M (2)	Age (3)	Diagnosis (4)	**ICD10** (5)	Applicator's location (6)	Used method (7)	Total number of procedures (8)
1.	**MZ**	**F**	**23**	Osteoarthritis deformans after healed trimalleolar fracture of the right lower leg	**S-82**	Medial side of the left knee joint	**M1**	**10**
2.	**BA**	**F**	**44**	Osteoarthritis of right wrist	**M-15**	Palm surface of the hand	**M3**	**10**
3.	**KK**	**F**	**28**	Heel spur of both feet	**M-77**	Plantar surface of left and right foot	**M1**	**6**
4.	**ZR**	**F**	**64**	Osteoarthritis deformans after healed trimalleolar fracture of the right lower leg	**S-82**	Side of the right ankle joint	**M1**	**10**

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l.p.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
5.	**SH**	**F**	**70**	Osteoarthritis of right wrist	**M-15**	Palm surface of the hand	**M1**	**10**
6.	**SJ**	**M**	**37**	Ankylosing spondylitis	**M-45**	Applicator pointed at three locations of the spine - cervical, thoracic, lumbar-sacral (5 minutes each)	**M1**	**10**

Data collection

In order to obtain the most objective results for all the groups, medical history was taken into consideration and following methods were used:

To estimate the pain disorders suffered by a patient, modified pain level scale („using child's face") was used. Patients directly estimated the levels during the procedures. For ease of the procedure, numerical and percentage scale were used as well.

Following criteria were adopted:

0% - very happy, no pain - (numerical 0)

25% - mild pain - (numerical 1-2)

50% - moderate pain - (numerical 3-4)

75% - severe pain - (numerical 5-6)

100% - pain is as strong as I can imagine (but I do not cry all the time) (numerical 7-8)

0 1 - 2 3 - 4 5 - 6 7 - 8

0% 25% 50% 75% 100%

- **Medical history – pains experienced overnight and pains experienced in the morning while moving the affected limb for the first time were taken into consideration (eg. going to the toilet in the morning, sanitary activities);**
- **in group I (ostheoarthritis of knee) following examinations were performed:**

a. manual palpation in selected knee pain locations

b. pain provocation test using modified Steinmann test

(patients stand on the affected limb and rotates the whole body with stabilized foot and shank)

- **in group II (painful shoulder syndrome) following procedures were performed:**
  - **a. movement measurement in upper limb rim joints and upper limb joints**
    - **upper limb lift (by bending)**
    - **upper limb side lift (by horizontal rotation)**
    - **upper limg straightening**
  - **b. pain provocation test by moving with a 1 kg dumbbell**
- **in group III the analysis was performed basing solely on the medical history; the following were taken into consideration:**
  - **a. pains experienced overnight**
  - **b. pains experienced during the day**

The above-mentioned examinations were performed on each patient just before the series of procedures and 1-3 days after the finished procedures.

- **after the experiment finished, patients directly evaluated the deep electromagnetic field stimulation procedures using the following scale:**

procedure's effectiveness	**(-) the procedure did not help me, I feel worse**
procedure's effectiveness	**0% the procedure did not help me, I feel the same as before the procedure**
procedure's effectiveness	**50% the procedure helped me, I feel a little better**
procedure's effectiveness	**75% the procedure helped me, I feel well**
procedure's effectiveness	**100% the procedure helped me a lot, I feel very well**

Test results

In group I (ICD-10,M-17) the total number of patients that participated in tests and procedures was 12, out of which 10 were female, 2 were male, with an average age of 66 (the youngest patient was 47, while the oldest was 76). Both knees joint pains were taken

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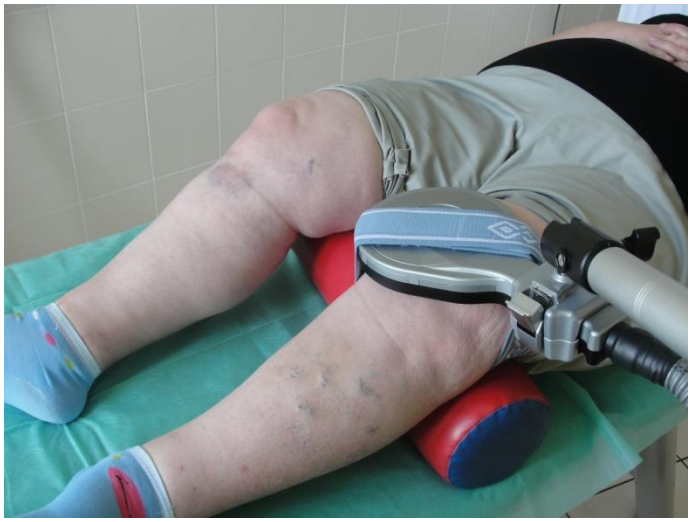
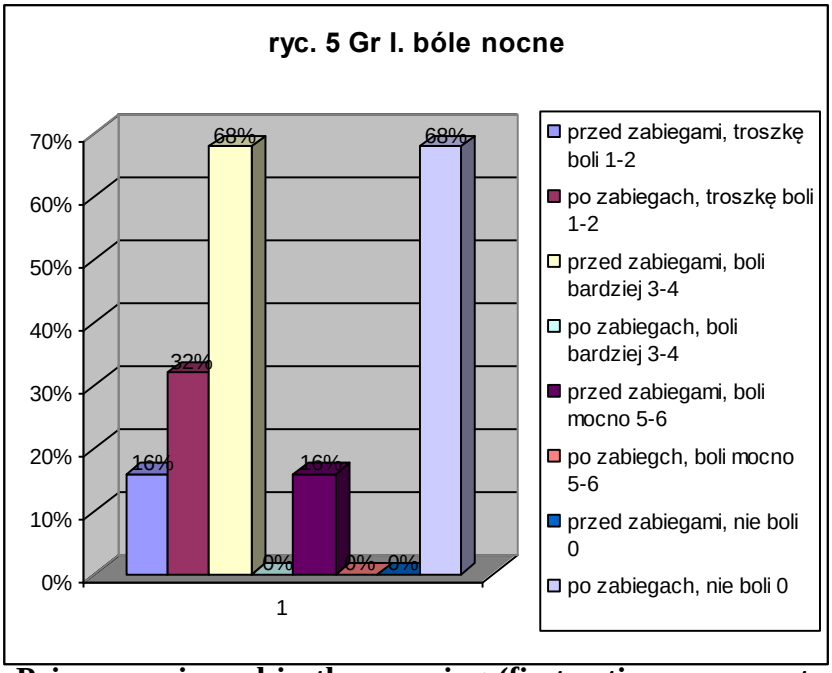
into consideration for 7 patients, while one knee joint pains were taken into consideration for 5 patients. The apliccator of the device was attached using elastic tape in the procedure's location (Picture 4)

Picture 4



- **Pains experienced overnight in group I (ICD-M17) were observed with 6 patients. Pain severity before and after the procedures using deep magnetic field is presented in picture 5.**



Picture 5. Gr. I night pains

Before the procedure, mild pain 1-2

Before the procedure, mild pain 1-2

Before the procedure, moderate pain 3-4

Before the procedure, moderate pain 3-4

Before the procedure, severe pain 5-6

After the procedure, severe pain 5-6

Before the procedure, no pain 0

After the procedure, no pain 0

- **Pains experienced in the morning (first active movements, eg. going to the toilet) in group I (ICD-M17) were observed with 11 patients. Pain severity before and after the procedures using deep magnetic field is presented in picture 6.**

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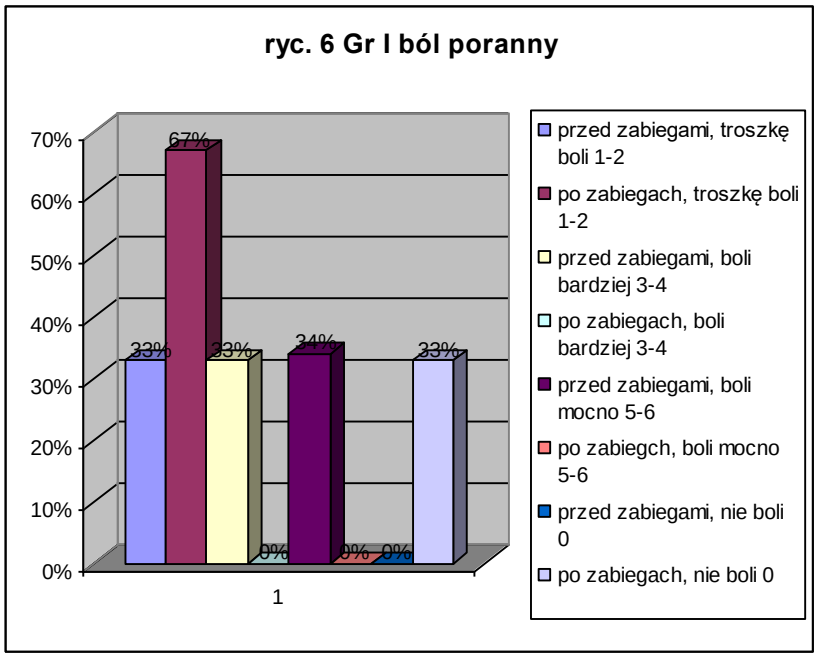


Picture 6. Gr. I morning pains

Before the procedure, mild pain 1-2

After the procedure, mild pain 1-2

Before the procedure, moderate pain 3-4

After the procedure, moderate pain 3-4

Before the procedure, severe pain 5-6

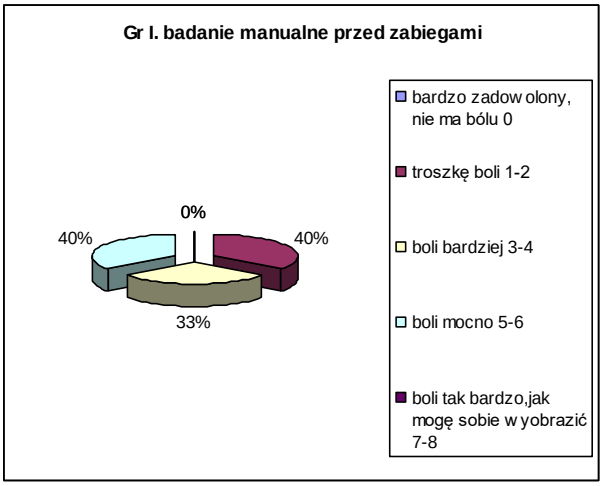
After the procedure, severe pain 5-6

Before the procedure, no pain 0

After the procedure, no pain 0

- **Pain during manual palpation around knee joint was observed with 9 patients from group I (ICD-M 17). Pain severity before and after the procedures using deep magnetic field is presented in picture 7 and picture 8.**

Picture 7 Pain during manual palpation around knee pain location for patients with osteoarthritis of knee joints before the procedures using deep magnetic field



Gr. I manual examination before the procedures

Very happy, no pain

Mild pain 1-2

Moderate pain 3-4

Severe pain 5-6

Pain is as strong as I can imagine 7-8

Picture 8 Pain during manual palpation around knee pain location for patients with osteoarthritis of knee joints after the procedures using deep magnetic field.

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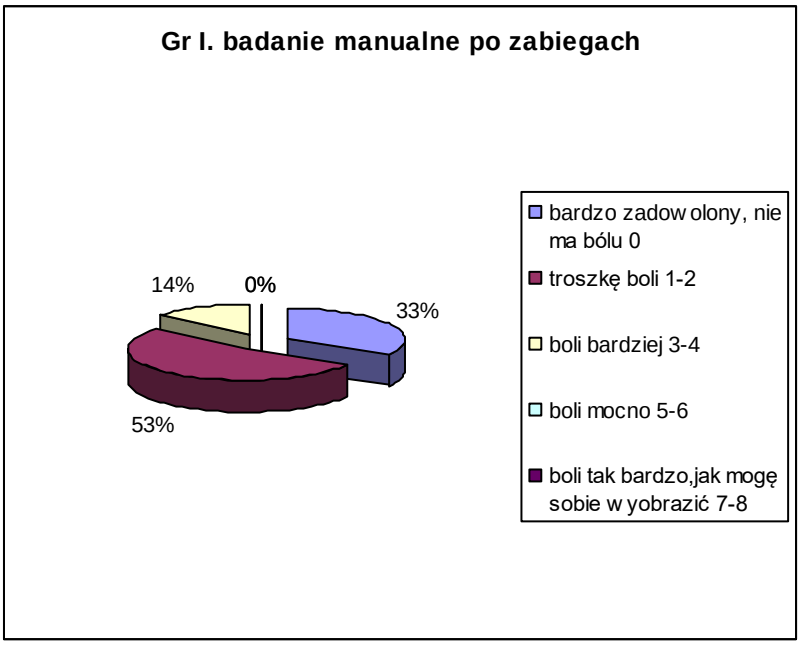


Gr. I manual examination after the procedures

Very happy, no pain

Mild pain 1-2

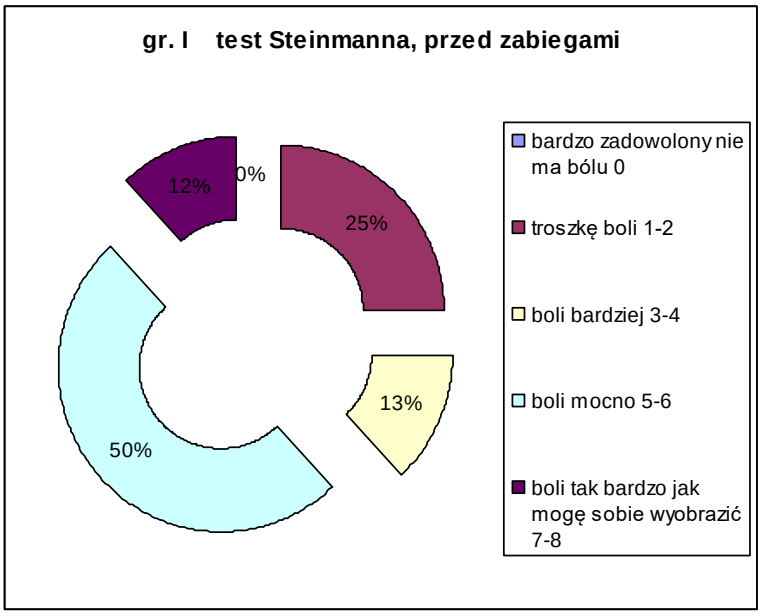
Moderate pain 3-4

Severe pain 5-6

Pain is as strong as I can imagine 7-8

- **Pains in group I (ICD, M-17) experienced during Steinmann test (pain provocation) were observed with 9 patients; 7 patients experienced pains in both knee joints. Pain severity before and after the procedures using deep magnetic field is presented in picture 9 and picture 10**

Picture 9



Gr. I Steinmann test, before the procedures

Very happy, no pain

Mild pain 1-2

Moderate pain 3-4

Severe pain 5-6

Pain is as strong as I can imagine 7-8

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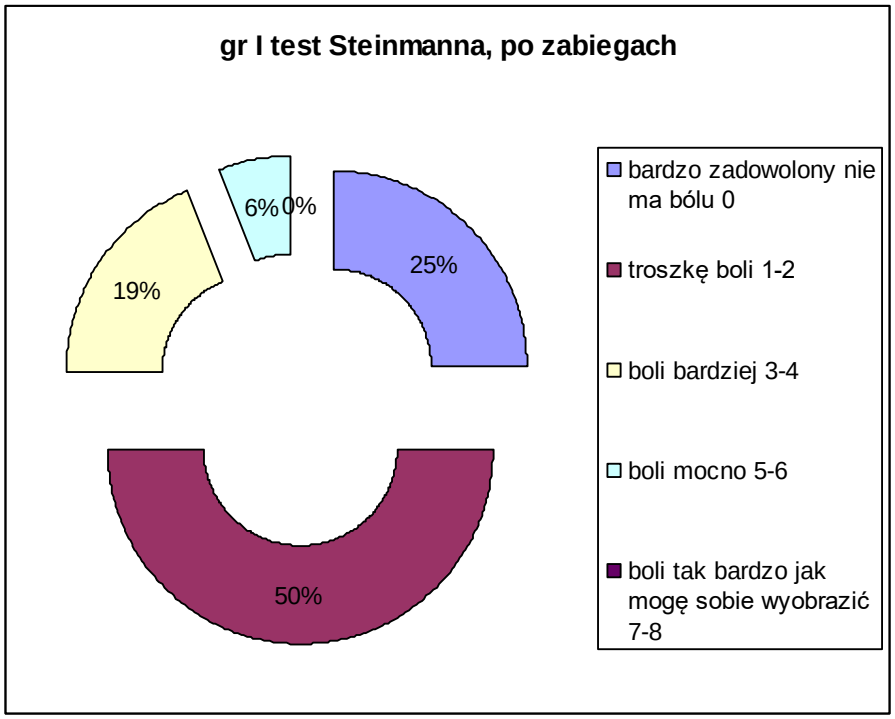
Picture 10



Gr. I Steinmann test, after the procedures

Very happy, no pain

Mild pain 1-2

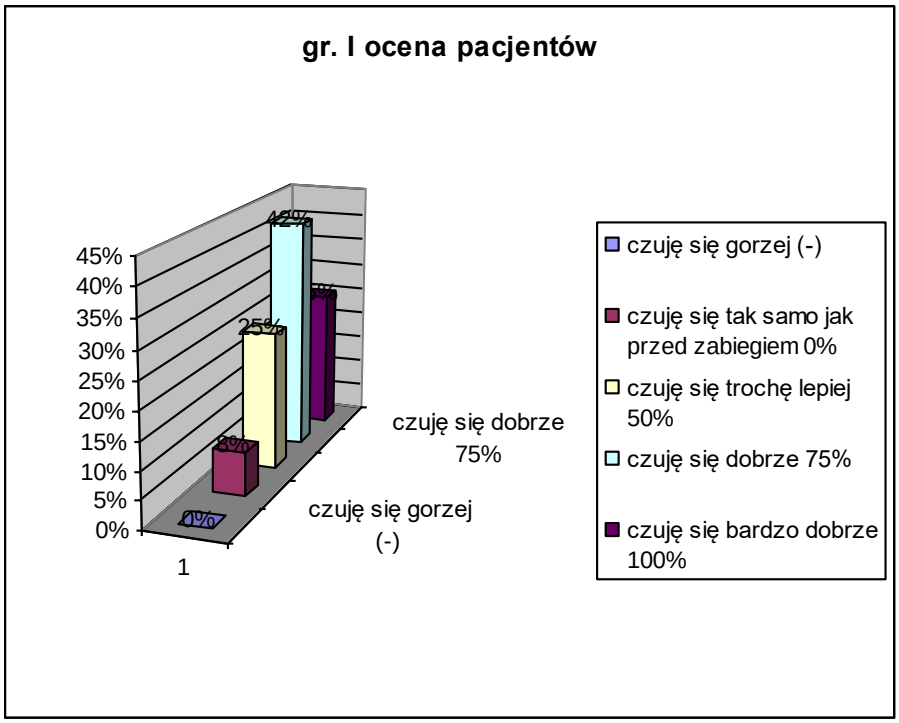
Moderate pain 3-4

Severe pain 5-6

Pain is as strong as I can imagine 7-8

- **Effectiveness of procedures for patients of group I (ICD 10, M-17) using deep magnetic field is presented in picture 11.**

Picture 11



Gr. I patients' evaluations

I feel worse (-)

I feel the same, as before the procedure 0%

I feel slightly better 50%

I feel well 75%

I feel very well 100%

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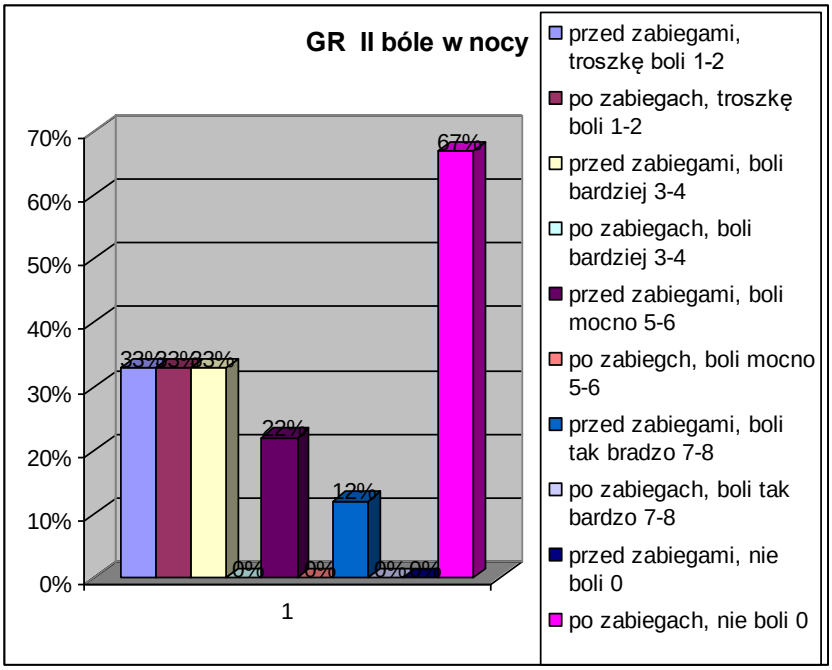
- **In group II (ICD-10,M-75) the total number of patients that participated in tests and procedures was 9, out of which 7 were female, 2 were male, with an average age of 59 (the youngest patient was 42, while the oldest was 78). The applicator settings during the procedure is presented in picture 12**

  Pains experienced overnight and pains experienced in the morning while moving the affected limb for the first time (eg. going to the toilet in the morning) before and after the procedure using deep magnetic field is presented in picture 13 and picture 14.

Picture 12

Picture 13



Picture 13. Gr. II night pains

Before the procedure, mild pain 1-2

After the procedure, mild pain 1-2

Before the procedure, moderate pain 3-4

After the procedure, moderate pain 3-4

Before the procedure, severe pain 5-6

After the procedure, severe pain 5-6

Before the procedure, very severe pain 7-8

After the procedure, very severe pain 7-8

Before the procedure, no pain 0

After the procedure, no pain 0

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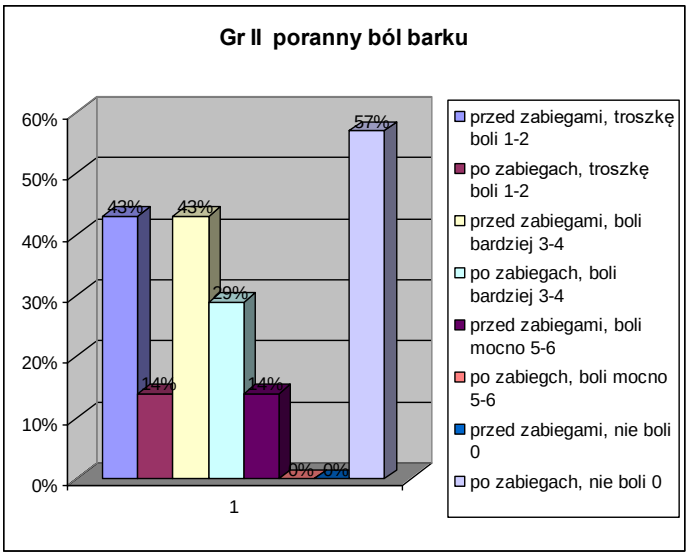
Picture 14



Picture 13. Gr. II morning shoulder pains

Before the procedure, mild pain 1-2

After the procedure, mild pain 1-2

Before the procedure, moderate pain 3-4

After the procedure, moderate pain 3-4

Before the procedure, severe pain 5-6

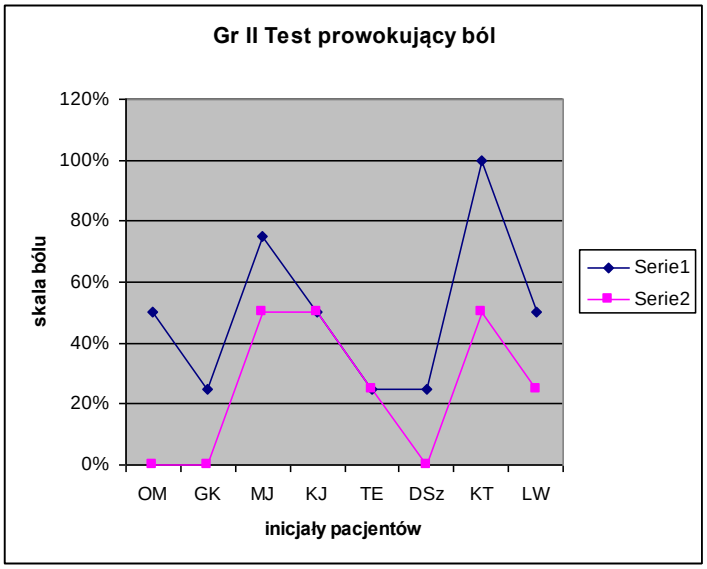
After the procedure, severe pain 5-6

Before the procedure, no pain 0

After the procedure, no pain 0

- **Movement measurements of upper limb rim joints and shoulder joints for patients in group II suffering from painful shoulder syndrome (ICD 10, M 75) did not influence any statistically relevant changes and thus it was not presented graphically.**
- **8 patients from group II (ICD 10, M75) participated in the pain provocation test using 1 kg dumbbells. Pain severity before and after the procedures using deep magnetic field is presented in picture 15**

Picture 15



Gr. II pain provocation test

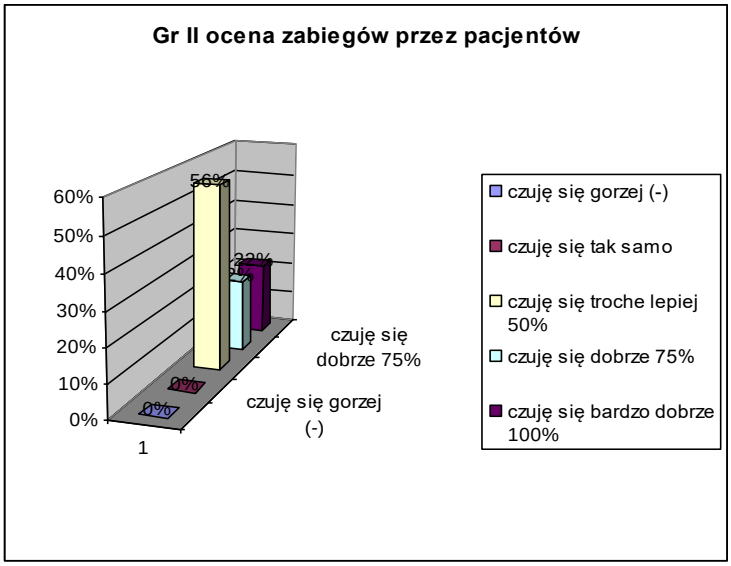
Pain scale

Patients' initials

Series 1 – blue color, pain severity before the procedures using deep magnetic field is presented
Series 2 – pink color, pain severity after the procedures using deep magnetic field is presented

- **Effectiveness of procedures for patients of group II (ICD 10, M-75) using deep magnetic field is presented in picture 16**

Picture 16



Gr. II patients' evaluations

I feel worse (-)

I feel the same, as before the procedure 0%

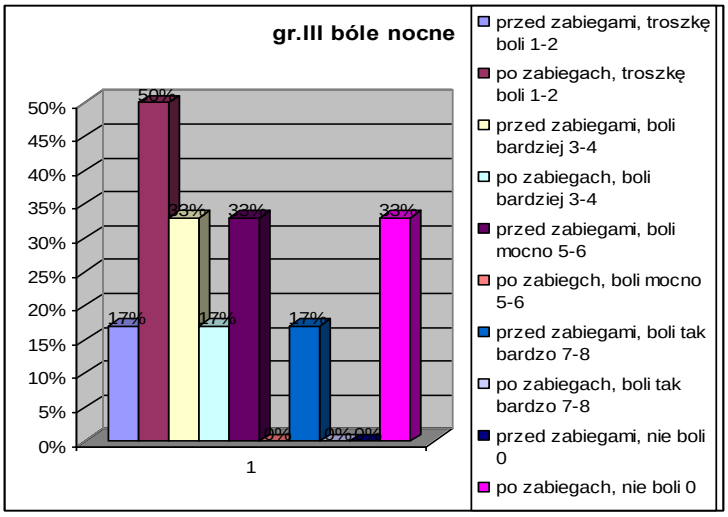
I feel slightly better 50%

I feel well 75%

I feel very well 100%

- **In group III (ICD disorders presented in picture 3) the total number of patients that participated in tests and procedures was 6, out of which 5 were female, 1 was male, with an average age of 44,3 (the youngest patient was 23, while the oldest was 70). Pains experienced overnight and pains experienced in the day before and after the procedure using deep magnetic field is presented in picture 17 and picture 18.**

Picture 17



Picture 13. Gr. II night pains

Before the procedure, mild pain 1-2

After the procedure, mild pain 1-2

Before the procedure, moderate pain 3-4

After the procedure, moderate pain 3-4

Before the procedure, severe pain 5-6

After the procedure, severe pain 5-6

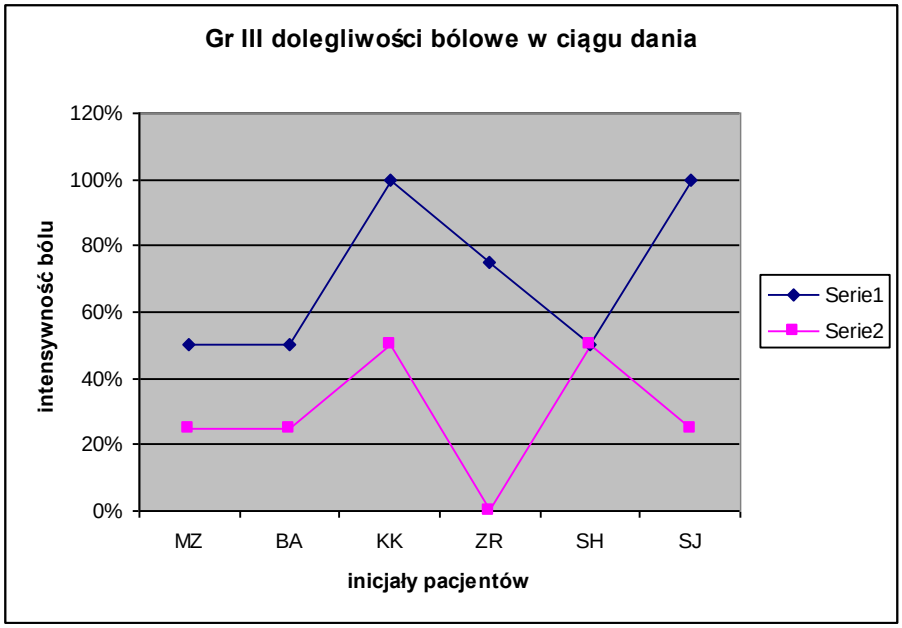
Before the procedure, very severe pain 7-8

After the procedure, very severe pain 7-8

Before the procedure, no pain 0

After the procedure, no pain 0

Picture 18



Gr. III pain suffered during day

Pain severity

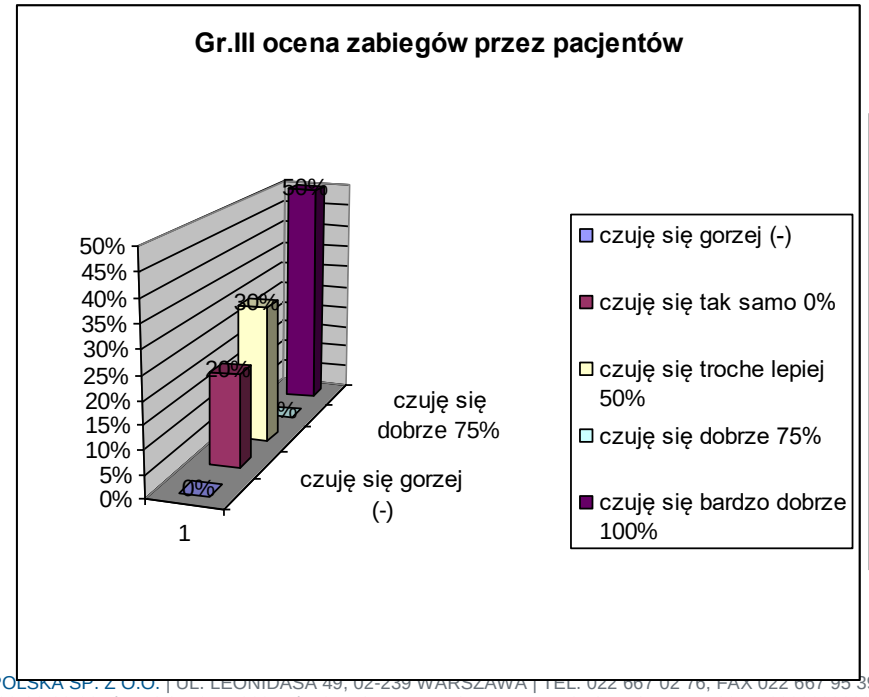
Patients' initials

Series 1 – blue color, pain severity before the procedures

Series 2 - red color, pain severity after the procedures

- **Effectiveness of procedures for patients of group II (ICD 10 presented in picture 3) is presented in picture 19**

Picture 19



Gr. III patients' evaluations

I feel worse (-)

I feel the same, as before the procedure 0%

I feel slightly better 50%

I feel well 75%

I feel very well 100%

Discussion

In all the subjcet groups where deep electromagnetic field stimulation procedures using SALUS-TALENT device were performed, rapid analgesic activity was observed. This fact complies with reports by Spa Dolni Lipova (Czech Republic) rehabilitation clinic, where same procedures were performed on patients with skeletomuscular disorders. Initial observation shows, that the best effects were recorded in group I – osteoarthritis of knee joints (ICD- 10, M-17). Also, very good results of 37-year-old male patient diagnosed with ankylosing spondylitis are worth mentioning. His pain was reduced dramatically. Similar effect was reached with a 64-year-old female patient suffering from osteoarthritis deformans after healed trimalleolar fracture.

In another case of 28-year-old female patient diagnosed with plantar fascia inflammation (heel spur), severe pains were observed during the therapy, that lead to aborting the procedures.

Therapeutic effects recorded while performing deep electromagnetic field stimulation procedures on patients of Department of Rehabilitation and Physical Therapy of Praski Hospital in Warsaw are interesting and encourage further tests, as we are yet to find out the detailed mechanisms behind very strong analgesic activities.

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Conclusions

1. **Deep electromagnetic field stimulation procedures using SALUS-TALENT device for patients with skeletomuscular disorders gives rapid analgesic activity;**
2. **Initial observation shows that deep electromagnetic field stimulation procedures give better end results compared to traditional methods used in physiotherapy, with less procedures and shorter times of procedures.**
3. **According to patients suffering from skeletomuscular disorders, deep electromagnetic field stimulation procedures are very effective.**

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