**Federal State-Funded Educational Institution of Higher Education "Smolensk State Medical University" of Ministry of Healthcare of the Russian Federation**

Department of Neuroscience, Physiotherapy and Reflex Therapy of the Faculty of Additional Professional Education of Smolensk State Medical University

R E P O R T

**On the 2nd stage of the scientific research work “Specifics of the electroneuromyographic parameters in patients with musculoskeletal pain syndromes before and after treatment by the Proprioceptive-Deep Tendon Reflex method (P-DTR)”**

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**Progress Report on the 2nd stage of the scientific research work “Characteristics of the electroneuromyographic parameters of patients with musculoskeletal pain syndromes before and after treatment with the method of Proprioceptive-Deep Tendon Reflex (P-DTR)”**

**The tasks of the 2nd stage of research:**

1. Selection of patients in the age of 15-80 having pain syndromes of the musculoskeletal system for researches, no less than 100 individuals.
2. Work with the patients having pain syndromes of the musculoskeletal system:

- finding out the primary and secondary dysfunctional receptor fields by the method of P-DTR;

- electromyographic research of the primary and secondary receptor fields before the P‑DTR treatment;

- electromyographic research of the normal receptor field, research of induced primary and secondary receptor fields;

- measuring affect of the primary receptor field on associated and indicator muscle;

- measuring affect of the secondary receptor field on associated and indicator muscle;

- registration of interceptive suppression before the P‑DTR treatment;

- registration of caused skin-sympathetic potential before the P‑DTR treatment;

- P‑DTR treatment;

- follow-up electromyographic research;

1. Academic paper (in the case if the correlation between primary and secondary receptor fields will be approved).

Electroneuromyographic research of the 2nd stage was conducted following a special program in accordance with the goals stated:

- research of reciprocal influence or primary and secondary dysfunction areas;

- confirm bigeminy of receptor fields and compensatory effect of secondary dysfunction areas to primary dysfunction areas.

The present research includes 151 patients with different pain syndromes of the musculoskeletal system, 78 women and 73 men. The most of them were patients with dorsopathies and pathologies of lower limb joints. The patients were 18-78 years old, the majority of them were patients older than 50 years old. A number of patients were excluded because of significant problems with peripheral neuromuscular apparatus found by ENMG. Functioning of peripheral nerves and their roots was studied in this purpose using the method of stimulation electroneuromyography. MUAP indicators of relevant muscles were studied, as well. A patient with such a pathology found by ENMG would excluded from the common list of the patients to be examined in that research. The patients included into the research were also subject of visualization (MRT, CT, or radiography of the respecting anatomical location), CBC, UA, standard set of biochemical blood indexes.

The program of electroneuromyographic research included estimation of bioelectrical activity from musculocutaneous receptor field. The activity research was conducted from musculocutaneous receptor fields. Research of normal receptor fields indicated different levels of bioelectrical activity (24 to 140 µV). The values were registered with calculation of average amplitudes of bioelectrical activity (µV). Therefore, bioelectrical activity of normal receptor fields was different on different parts even within one anatomical location: so, bioelectrical activity on the face was, by an average, higher than that on feet skin. In the same time, even within one anatomical location (e.g. on a palm) the wide range of parameters was found. It may be assumed that there is a correlation between receptor units’ density and bioelectrical activity. Further research regarding this matter is required for study of bioelectrical activity norms on various areas of patient’s body. Bioelectrical activity from normal receptor fields did not change when stimulating areas of primary and secondary dysfunction.

Bioelectrical activity in areas of primary and secondary general dysfunction were studied, as well. Needle derivation with calculation of average amplitude of bioelectrical activity in µV was used for that. Receptor fields were chosen in accordance with P-DTR method. Changes in activity of dermal receptor apparatus of primary and secondary general dysfunction areas at rest were estimated in accordance with the protocol given:

- study of electrical activity of primary receptor field with no stimulation before the P‑DTR treatment;

- study of electrical activity of primary receptor field with stimulation of the primary one with its own stimulus;

- study of electrical activity of primary receptor field with stimulation of the secondary general one with its own stimulus;

- study of electrical activity of primary receptor field with stimulation of the primary one with a disincentive;

- study of electrical activity of primary receptor field with stimulation of the secondary general one with a disincentive;

- study of electrical activity of primary receptor field with stimulation of the area not related to dysfunction;

- study of electrical activity of primary receptor field after the P‑DTR treatment;

- study of electrical activity of secondary receptor field with no stimulation before the P‑DTR treatment;

- study of electrical activity of secondary receptor field with stimulation of the primary one with its own stimulus;

- study of electrical activity of secondary receptor field with stimulation of the secondary general one with its own stimulus;

- study of electrical activity of secondary receptor field with stimulation of the primary one with a disincentive;

- study of electrical activity of secondary receptor field with stimulation of the secondary general one with a disincentive;

- study of electrical activity of secondary receptor field with stimulation of the area not related to dysfunction;

- study of electrical activity of secondary receptor field after the P‑DTR treatment;

The data obtained:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary dysfunction with no stimulus | Primary dysfunction with stimulation of primary one | Primary dysfunction with stimulation of secondary one | Primary dysfunction with antistimulation of primary one | Primary dysfunction with antistimulation of secondary one | Indifferent area | Primary dysfunction after treatment | Secondary dysfunction with no stimulus | Secondary dysfunction with stimulation of primary one | Secondary dysfunction with stimulation of secondary one | Secondary dysfunction with antistimulation of primary one | Secondary dysfunction with antistimulation of secondary one | Indifferent area | Secondary dysfunction after treatment |
| 60,4 | 76,1 | 52,4 | 49,7 | 61,8 | 60,9 | 31,7 | 56,4 | 65,7 | 73,8 | 47,4 | 49,8 | 56,8 | 45,5 |
| 90,3 | 112,3 | 82,7 | 74,5 | 91,7 | 90,7 | 47,8 | 82,8 | 93,5 | 97,6 | 58,4 | 55,8 | 83,6 | 55,2 |
| 67,4 | 87,1 | 58,3 | 54,6 | 69 | 67,9 | 49,8 | 58,9 | 69,4 | 78,4 | 46,5 | 47,8 | 59,1 | 44,3 |
| 83,1 | 99,1 | 76,6 | 75,1 | 85,1 | 82,9 | 52,1 | 81,4 | 91,2 | 95,6 | 65,4 | 69,8 | 81,7 | 64,2 |
| 96,4 | 110,3 | 89,7 | 84,2 | 98,1 | 96,9 | 59,8 | 83,1 | 94,8 | 97,8 | 62,8 | 63,8 | 83,9 | 59,4 |
| 93,2 | 117,1 | 86,1 | 80,1 | 95,1 | 93,6 | 64,1 | 85,8 | 96,1 | 101,4 | 65,1 | 64,9 | 85,1 | 62,4 |
| 85,1 | 96,1 | 79,1 | 76,2 | 89,5 | 85,5 | 52,3 | 75,8 | 81,4 | 86,2 | 60,2 | 61,8 | 75,6 | 58,7 |
| 86,4 | 100,2 | 76,3 | 70,1 | 90,2 | 86,9 | 49,8 | 82,1 | 90,1 | 94,1 | 70,8 | 71,5 | 82,9 | 68,8 |
| 100,1 | 115,4 | 93,1 | 90,1 | 105,9 | 100,5 | 60,7 | 86,7 | 96,4 | 99,7 | 55,2 | 57,1 | 86,9 | 53,5 |
| 60,3 | 80,6 | 52,3 | 50,1 | 64,5 | 61 | 33,5 | 58,9 | 67,5 | 72,5 | 49,8 | 52 | 59,2 | 47,9 |
| 60,7 | 77,5 | 51,3 | 49,8 | 64,9 | 61,1 | 33,9 | 61,5 | 70,1 | 75,4 | 50,1 | 49 | 62,1 | 47,4 |
| 61,5 | 80,2 | 52,3 | 51,9 | 65,4 | 61,9 | 45,9 | 59,8 | 64,5 | 74,5 | 48,7 | 50 | 59,7 | 46,3 |
| 63,7 | 85,4 | 55,8 | 52,8 | 67,9 | 64,1 | 39,7 | 57,8 | 63,4 | 71,5 | 46,5 | 53,8 | 58,5 | 43,8 |
| 64,8 | 75,1 | 55,9 | 49,7 | 70,1 | 65,1 | 37,5 | 58,8 | 67,8 | 75,6 | 50,1 | 53,1 | 59,2 | 49 |
| 71,8 | 92,6 | 63,2 | 58,4 | 75,8 | 72,9 | 45,6 | 69,8 | 78 | 86,9 | 60,8 | 65 | 70,3 | 60,2 |
| 83,4 | 105,2 | 74,9 | 65,2 | 89,2 | 83,7 | 52,8 | 67,8 | 78,9 | 88,1 | 58,5 | 61,8 | 67,5 | 57,9 |
| 93,1 | 112,4 | 86,4 | 77,5 | 96,7 | 93,8 | 46,5 | 81,4 | 92,1 | 98,1 | 68,1 | 72 | 81,5 | 67,5 |
| 96,1 | 116,2 | 87,6 | 80,7 | 98,7 | 96 | 65,2 | 76,8 | 85,1 | 94,5 | 64,1 | 63,5 | 76,9 | 61,2 |
| 84,2 | 96,3 | 76,8 | 71,5 | 86,5 | 84,5 | 53,5 | 72,5 | 77,8 | 83,6 | 58,2 | 62 | 72,9 | 57,2 |
| 88,1 | 100,4 | 79,6 | 71,3 | 90,1 | 88,6 | 46,5 | 70,9 | 78,4 | 88,9 | 46,8 | 46,4 | 71,5 | 44,6 |
| 89,4 | 103,1 | 79,1 | 67,5 | 92,4 | 90 | 49,8 | 61,9 | 70,2 | 79,1 | 49,5 | 51,9 | 62,3 | 48,9 |
| 83,5 | 99,7 | 74,2 | 65,2 | 91,2 | 82,7 | 51,2 | 76,8 | 82,4 | 89,6 | 59,6 | 63,5 | 76,8 | 58,3 |
| 86,9 | 101,8 | 75,6 | 70,4 | 93,4 | 86,7 | 50,4 | 68,9 | 74,2 | 82,5 | 49,8 | 49,8 | 69,3 | 49,3 |
| 87,4 | 97,8 | 78,1 | 71,3 | 92,1 | 88,2 | 56,1 | 75,9 | 81,4 | 89,8 | 59,8 | 62,8 | 76,5 | 58,8 |
| 88,4 | 105,2 | 79,1 | 71,8 | 89,6 | 89 | 49,9 | 65,9 | 73,4 | 80,1 | 55,4 | 57,5 | 66,2 | 53,5 |
| 91,2 | 115,6 | 80,1 | 77,5 | 94,3 | 91,6 | 41,3 | 74,3 | 81,5 | 86,9 | 61,3 | 59,5 | 74,9 | 58,9 |
| 69,3 | 82,6 | 59,2 | 54 | 72,1 | 68,4 | 38,1 | 65,7 | 73,4 | 81,4 | 58,4 | 56,1 | 66,7 | 55,4 |
| 69,7 | 86,2 | 58,4 | 48,2 | 72,5 | 69,9 | 33,8 | 62,8 | 75,1 | 80,6 | 50,2 | 54 | 63,4 | 49,9 |
| 73,1 | 91,8 | 63,4 | 58,7 | 75,9 | 73,9 | 37,9 | 63,2 | 74,2 | 80,4 | 57 | 58,8 | 63,5 | 56,1 |
| 74,2 | 88,9 | 65,4 | 49,1 | 77,5 | 74,2 | 39,8 | 53,4 | 63,4 | 72,4 | 46,3 | 49,8 | 53,9 | 45,9 |
| 77,4 | 94,3 | 68,1 | 60,4 | 79,8 | 77,3 | 46,9 | 59,8 | 68,9 | 76,4 | 50,2 | 48,1 | 60,3 | 47,7 |
| 78,1 | 98,4 | 67,9 | 60,1 | 80,6 | 78,9 | 55,6 | 56,1 | 68,3 | 79,8 | 50,2 | 51,8 | 56,5 | 49 |
| 83,1 | 111,3 | 74,9 | 70,8 | 86,7 | 83 | 59,8 | 64,7 | 75,1 | 80,1 | 59,6 | 57,3 | 64,7 | 56,2 |
| 92,1 | 115,2 | 81,6 | 79,8 | 96,5 | 92 | 69,8 | 71,8 | 80,9 | 86,5 | 64,4 | 65,5 | 71,7 | 63,9 |
| 94,5 | 108,1 | 83,1 | 78,2 | 98,9 | 95,1 | 56,9 | 70,8 | 81,6 | 87,9 | 60,3 | 60,3 | 71,5 | 59,8 |
| 101,1 | 123,4 | 91,3 | 83,4 | 108,7 | 101,2 | 76,9 | 79,8 | 84,9 | 91,2 | 64,5 | 66,1 | 80,5 | 63,9 |
| 56,4 | 77,3 | 48,1 | 47,5 | 60,2 | 56,3 | 37,9 | 62,8 | 71,6 | 86,9 | 46,5 | 53,1 | 63,5 | 45,9 |
| 103,8 | 126,4 | 86,7 | 80,4 | 110,4 | 103,9 | 50,4 | 76,9 | 87,1 | 94,2 | 53,6 | 55,1 | 78 | 52,9 |
| 64,7 | 78,2 | 55,4 | 50,3 | 68,9 | 64,9 | 49,8 | 46,8 | 57,9 | 61,2 | 41,7 | 46,4 | 47,3 | 40,5 |
| 87,3 | 99,2 | 79,2 | 70,1 | 89,4 | 87,2 | 50,4 | 65,7 | 76,4 | 83,9 | 56,5 | 57,8 | 66,2 | 55,7 |
| 88,4 | 105,4 | 78,6 | 72,8 | 92,1 | 88,9 | 64,9 | 68,9 | 77,9 | 82,6 | 53,4 | 59,6 | 69,2 | 52,8 |
| 93,2 | 117,4 | 85,4 | 71,2 | 96,7 | 93,2 | 48,9 | 66,4 | 78,2 | 85,4 | 56,8 | 54,4 | 66,2 | 53,9 |
| 96,1 | 113,1 | 86,4 | 84,6 | 98,9 | 96,2 | 68,9 | 80,4 | 87,9 | 93,4 | 59,6 | 57,8 | 80,2 | 57,7 |
| 97,4 | 123,1 | 89,7 | 83,4 | 99,2 | 97,8 | 63,5 | 83,1 | 91,8 | 96,7 | 54,5 | 54,8 | 83 | 53,8 |
| 99,1 | 125 | 85,3 | 79,2 | 102,5 | 99,1 | 46,9 | 78,1 | 86,7 | 92,1 | 64,1 | 63,9 | 78 | 62,2 |
| 98,2 | 118,1 | 86,7 | 80,1 | 100,2 | 98,2 | 68,9 | 78,9 | 85,9 | 92,4 | 65,1 | 69,8 | 76,5 | 63,8 |
| 85,4 | 100,4 | 74,6 | 68,3 | 88,9 | 85,4 | 64,3 | 68,5 | 76,8 | 82,4 | 64,3 | 64,8 | 68,7 | 62,9 |
| 89,3 | 109,2 | 76,1 | 70,1 | 91,2 | 89,6 | 56,4 | 71,9 | 78,9 | 84,5 | 58,4 | 61 | 71,6 | 56,5 |
| 85,1 | 112 | 75,6 | 70,3 | 86,7 | 85,2 | 55,1 | 69,2 | 78,9 | 87,1 | 55,1 | 58,8 | 69,1 | 53,2 |
| 81,4 | 104,1 | 69,3 | 61,8 | 83,4 | 81,3 | 46,2 | 62,7 | 73,5 | 80 | 53,1 | 56,1 | 67,3 | 51 |
| 76,1 | 92,1 | 67,4 | 62,4 | 79,8 | 76,1 | 59,8 | 63,4 | 74,9 | 80,1 | 57,1 | 57,8 | 63,3 | 55,2 |
| 83,4 | 103,5 | 72,9 | 67 | 87,8 | 83,9 | 56,4 | 72,5 | 84,4 | 88,2 | 65,1 | 68,8 | 72,3 | 64 |
| 75,8 | 97,5 | 64,3 | 58,9 | 78,9 | 76,9 | 49,6 | 64,4 | 76,2 | 81,4 | 47,4 | 53,1 | 64,9 | 45 |
| 63,2 | 87,5 | 58,2 | 50,1 | 65,7 | 63,9 | 43,7 | 48,9 | 57,9 | 62,1 | 42,1 | 51,8 | 48,6 | 41 |
| 94,2 | 110,7 | 80,1 | 76,3 | 95,5 | 94,2 | 66,1 | 65,8 | 70,8 | 74,5 | 51,1 | 54,8 | 65,8 | 48,9 |
| 89,1 | 109,1 | 80,5 | 72 | 90,4 | 89,2 | 58,9 | 71,8 | 82,7 | 85,1 | 53,1 | 59,8 | 71,5 | 50,9 |
| 92,2 | 115,9 | 81,3 | 76,2 | 94,1 | 92,8 | 67,9 | 76,4 | 81,5 | 85,3 | 52,6 | 61,4 | 76,9 | 50,2 |
| 94,3 | 111,7 | 83,4 | 78,2 | 95,3 | 94,3 | 59,8 | 69,4 | 76,5 | 81,2 | 47,6 | 57,8 | 69,2 | 45,6 |
| 88,1 | 99,5 | 76,3 | 70,1 | 92,3 | 88,1 | 59,8 | 68,4 | 73,4 | 79,4 | 49,4 | 58,8 | 68,6 | 47,7 |
| 87,3 | 108,2 | 76,4 | 67,3 | 88,7 | 87,4 | 56,9 | 67,5 | 71,5 | 78,9 | 52,7 | 57,8 | 67,5 | 51,3 |
| 62,4 | 81,1 | 55,6 | 45,6 | 65,8 | 62,3 | 42,7 | 59,8 | 65,7 | 75,6 | 53,4 | 56,8 | 60,5 | 51,8 |
| 63,1 | 81,2 | 55,7 | 49,8 | 65,1 | 64,1 | 45,7 | 62,8 | 69,8 | 74,6 | 49,8 | 52 | 62,5 | 47,4 |
| 78,1 | 110,1 | 67,2 | 51,3 | 80,1 | 78,1 | 48,9 | 62,4 | 70,1 | 76,8 | 54,3 | 56,8 | 62,9 | 52,4 |
| 88 | 102,3 | 79,6 | 72,4 | 92,5 | 88,1 | 63,8 | 68,3 | 76,9 | 82,3 | 56,8 | 61 | 69,1 | 54,4 |
| 84,2 | 106,8 | 73,5 | 69,8 | 86,9 | 84,9 | 61,9 | 61,4 | 69,8 | 74 | 54,7 | 56,5 | 62,1 | 52,9 |
| 91 | 113,2 | 82,1 | 76,1 | 93,6 | 91,1 | 62,9 | 73,8 | 79,1 | 85,6 | 60,2 | 67 | 73,5 | 55,4 |
| 59,6 | 81,2 | 51,3 | 46,2 | 63,4 | 59,6 | 45,2 | 63,4 | 70,2 | 78,9 | 49,3 | 57,1 | 63,5 | 46,2 |
| 97,8 | 114,6 | 87,5 | 80,3 | 100,8 | 97,8 | 76,9 | 78,9 | 86,5 | 92,3 | 63,4 | 62,4 | 78,9 | 61,2 |
| 99,2 | 113,5 | 91,3 | 84,3 | 102,1 | 99,3 | 74,8 | 83,7 | 95,6 | 100,7 | 61,2 | 65,6 | 83,6 | 59,9 |
| 104,2 | 121,1 | 96,4 | 86,1 | 107,9 | 104,7 | 72,5 | 82,4 | 89,8 | 93,4 | 59,3 | 56,4 | 82,2 | 54,3 |
| 97,8 | 117,5 | 87,3 | 80,1 | 98,6 | 97,7 | 68,9 | 78,9 | 86,5 | 90,1 | 49,8 | 52 | 78,7 | 47,7 |
| 69,1 | 92,4 | 60,8 | 55,9 | 71,9 | 69,1 | 46,5 | 52,8 | 64,5 | 69,8 | 49,1 | 49 | 52,7 | 47,1 |
| 95,1 | 114,3 | 89,8 | 84,3 | 96,5 | 95,1 | 56,9 | 80,1 | 89,1 | 95,4 | 61,2 | 57,5 | 79,9 | 57,1 |
| 97,3 | 114,2 | 90,2 | 80,1 | 102,3 | 97,3 | 69,2 | 76,5 | 83,1 | 90 | 53,4 | 53,3 | 76,2 | 51,1 |
| 104,8 | 118,2 | 92,3 | 83,4 | 106,1 | 104,7 | 76,5 | 80,4 | 86,1 | 92,8 | 58,7 | 54,1 | 80,1 | 53,5 |
| 106,5 | 116,4 | 93,4 | 78,1 | 110,2 | 106,5 | 46,9 | 76,9 | 82,5 | 87,8 | 52,3 | 51,8 | 76,5 | 50,1 |
| 92,6 | 117,2 | 85,8 | 69,8 | 95,7 | 92,9 | 59,8 | 65,8 | 72,5 | 76,3 | 45,8 | 53,4 | 85,4 | 44,8 |
| 89,2 | 103,4 | 81,4 | 69,2 | 93,4 | 89,3 | 53,6 | 72,5 | 79,8 | 84,2 | 47,8 | 53,1 | 72,5 | 45,3 |
| 91,2 | 109,2 | 82,9 | 68,1 | 93,8 | 91,4 | 55,1 | 71,4 | 76,9 | 81,3 | 47,1 | 55,5 | 71,1 | 45,4 |
| 90,4 | 104,8 | 83,5 | 73,4 | 91,4 | 90,6 | 66,4 | 76,8 | 82,8 | 87,1 | 49,8 | 57,8 | 76,2 | 47,7 |
| 93,5 | 110,2 | 83,5 | 71,2 | 96,8 | 93,6 | 51,2 | 78,1 | 85,4 | 91,8 | 59,6 | 65,1 | 77,8 | 58,3 |
| 88,1 | 99,3 | 78,1 | 70,1 | 92,3 | 88,2 | 52,6 | 68,9 | 75,4 | 80,1 | 47,3 | 61,4 | 68,9 | 47 |
| 88,9 | 98,2 | 75,4 | 67,1 | 91,6 | 88,9 | 60,8 | 67,9 | 77,5 | 81,2 | 51,1 | 60,1 | 67,3 | 49,4 |
| 95,7 | 106,4 | 88,1 | 80,4 | 96,8 | 95,9 | 56,4 | 76,5 | 85,4 | 90,3 | 49,2 | 60,4 | 76,1 | 48,7 |
| 108,4 | 118,7 | 98,7 | 84,6 | 110,5 | 108,5 | 62,4 | 82,4 | 89,4 | 95,4 | 61,1 | 68,1 | 82,4 | 60,3 |
| 115,6 | 129,1 | 96,7 | 79,8 | 117,5 | 115,6 | 62,8 | 76,1 | 82,5 | 86,4 | 57,3 | 62,1 | 75,9 | 56,3 |
| 103,5 | 115,1 | 89,6 | 75,9 | 110,7 | 103,5 | 68,9 | 81,2 | 87,4 | 91,2 | 59,2 | 66,1 | 81,1 | 58,2 |
| 121,1 | 137,5 | 101,5 | 71,5 | 132,5 | 121,2 | 58,6 | 72,8 | 78,9 | 86,5 | 61,7 | 64,8 | 72,2 | 59,9 |
| 94,6 | 111,2 | 81,3 | 68,9 | 98,6 | 94,5 | 55,4 | 65,8 | 72,1 | 80,3 | 43,5 | 53,4 | 65,4 | 43,3 |
| 98,2 | 111,7 | 89,8 | 79,1 | 108,9 | 98,9 | 59,8 | 81,4 | 87,8 | 89,6 | 58,9 | 66,8 | 81,1 | 57,9 |
| 121,1 | 132,4 | 108,1 | 95,4 | 127,8 | 121,8 | 76,4 | 76,4 | 84,1 | 86,4 | 56,7 | 63,1 | 76,1 | 55,2 |
| 112,3 | 128,1 | 96,4 | 92,7 | 121,7 | 112,9 | 68,7 | 76,1 | 82,6 | 87,9 | 54,3 | 61,8 | 75,7 | 53,8 |
| 74,5 | 87,1 | 60,1 | 52,6 | 82,3 | 74,4 | 47,8 | 54,9 | 61,8 | 68,8 | 44,7 | 50 | 53,9 | 43,2 |
| 96,2 | 111,7 | 85,3 | 65,4 | 102,3 | 96,3 | 52,3 | 56,8 | 63,4 | 69,3 | 46,9 | 53,1 | 56,1 | 45,2 |
| 85,3 | 100,4 | 74,9 | 63,9 | 92,3 | 85,5 | 59,8 | 58,9 | 65,7 | 73,5 | 45,1 | 49,8 | 58,1 | 44,1 |
| 87,3 | 105,1 | 76,8 | 68,1 | 97,3 | 87,6 | 55,4 | 57,8 | 64,1 | 70,2 | 48,3 | 54 | 57,9 | 47,7 |
| 86,4 | 106,3 | 71,2 | 69,2 | 96,8 | 86,9 | 52,4 | 72,4 | 78,9 | 86,9 | 53,2 | 63,8 | 72,1 | 52,6 |
| 88,1 | 108,1 | 79,3 | 70,4 | 96,4 | 88,2 | 55,7 | 68,1 | 76,4 | 83,4 | 47,4 | 57,4 | 67,5 | 45,2 |
| 95,6 | 124 | 84,2 | 76,8 | 117,8 | 96,9 | 62,4 | 72,1 | 78,9 | 84,6 | 59,1 | 63,8 | 72,4 | 58,1 |
| 94,6 | 111,2 | 84,3 | 72,4 | 98,9 | 95,4 | 59,8 | 68,4 | 76,4 | 86,4 | 55,4 | 59,8 | 67,9 | 54 |
| 86,5 | 99,2 | 78,1 | 70,1 | 88,2 | 86,9 | 65,8 | 67,4 | 77,1 | 81,5 | 57,4 | 61,8 | 67,1 | 55,4 |
| 76,3 | 87,1 | 68,2 | 60,8 | 82,6 | 76,8 | 52,4 | 64,9 | 75,1 | 80,1 | 59,4 | 59,9 | 64,1 | 57,9 |
| 96,3 | 111,2 | 87,4 | 80,2 | 98,8 | 96,3 | 62,8 | 76,8 | 81,8 | 85,4 | 63,2 | 69,8 | 76,1 | 62,8 |
| 92,3 | 112,3 | 86,4 | 78,6 | 93,5 | 92,3 | 65,8 | 56,8 | 64,3 | 69,8 | 50,8 | 54 | 56,1 | 50 |
| 96 | 116,2 | 85,4 | 79,8 | 96,9 | 96,8 | 58,7 | 68,9 | 74,2 | 80,1 | 62,4 | 64,8 | 68,2 | 61,9 |
| 92,1 | 114,3 | 82,2 | 76,8 | 93,4 | 92,2 | 58,9 | 52,4 | 59,4 | 64,9 | 47,4 | 49,8 | 52,1 | 46,2 |
| 86,4 | 103,1 | 74,3 | 68,5 | 92,5 | 86,5 | 56,9 | 63,5 | 71,3 | 77,5 | 45,1 | 54,6 | 63,1 | 43,9 |
| 89,3 | 102,1 | 78,9 | 69,1 | 93,5 | 89,2 | 57,8 | 65,8 | 78,1 | 83,9 | 60,1 | 60,1 | 65,2 | 59,7 |
| 94,1 | 110,2 | 81,4 | 70,6 | 97,8 | 94,1 | 56,8 | 62,4 | 74,3 | 79,9 | 55,8 | 56,8 | 62,5 | 53,2 |
| 87,1 | 100,2 | 76,9 | 69,8 | 89,8 | 87,6 | 54,8 | 58,7 | 62,5 | 70,1 | 47,4 | 51,8 | 59,1 | 46,8 |
| 92,6 | 113,1 | 78,2 | 70,8 | 96,5 | 93,2 | 61,8 | 65,8 | 79,1 | 86,4 | 51,3 | 57,8 | 65,1 | 50,6 |
| 104,3 | 118,2 | 92,1 | 86,4 | 107,8 | 104,5 | 65,8 | 50,3 | 66,4 | 71,3 | 45,6 | 43,8 | 49,8 | 43,2 |
| 105,1 | 117,2 | 98,4 | 90,5 | 108,9 | 105,2 | 75,8 | 76,5 | 86,9 | 92,3 | 58,7 | 63,8 | 76,1 | 58 |
| 88,6 | 99,4 | 78,4 | 70,4 | 90,1 | 88,7 | 65,8 | 59,8 | 75,8 | 79,9 | 50,9 | 51,8 | 58,7 | 50,1 |
| 74,5 | 94,1 | 64,9 | 59,8 | 78,9 | 74,5 | 52,4 | 56,9 | 67,4 | 72,1 | 47,5 | 52,9 | 57,5 | 45,8 |
| 77,1 | 93,4 | 64,5 | 57,5 | 79,1 | 77,8 | 46,8 | 68,9 | 78,1 | 83,1 | 52,4 | 62,4 | 68,3 | 50,9 |
| 82,3 | 104,2 | 74,5 | 70,5 | 83,5 | 82,4 | 49,9 | 58,4 | 66,8 | 71,2 | 51,33 | 56,1 | 59,1 | 48,7 |
| 89,5 | 110,2 | 81,2 | 70,9 | 91,1 | 89,5 | 58,9 | 52,1 | 69,1 | 76,1 | 40 | 48,4 | 51,7 | 39,6 |
| 91,3 | 115,4 | 79,8 | 70,1 | 93,5 | 91,9 | 52,3 | 53,1 | 68,3 | 73,4 | 40,2 | 45,1 | 52,8 | 39,5 |
| 94,5 | 116,3 | 84,6 | 76,3 | 95,2 | 94,5 | 54,6 | 57,9 | 67,2 | 72,5 | 42,3 | 55,7 | 58,4 | 41,9 |
| 87,3 | 99,1 | 76,8 | 68,9 | 89,2 | 87,3 | 52,1 | 53,4 | 70,1 | 75,4 | 46,5 | 48,8 | 53,1 | 45,9 |
| 99,6 | 120,1 | 90,4 | 73,4 | 101,5 | 100,5 | 62,3 | 58,4 | 75,1 | 80,1 | 48,8 | 54 | 58,1 | 45,5 |
| 84,3 | 100,8 | 74,9 | 63,4 | 85,2 | 84,9 | 56,7 | 51,2 | 69,2 | 75,4 | 43,5 | 49,8 | 57,8 | 40,9 |
| 86,1 | 100,7 | 70,1 | 60,8 | 89,7 | 86,4 | 50,1 | 87,6 | 94,5 | 102,5 | 52,2 | 62,6 | 88,2 | 48,7 |
| 80,3 | 101,2 | 71,8 | 63,4 | 83,9 | 81,1 | 49,8 | 58,9 | 71,2 | 75,8 | 49,8 | 51,8 | 58,6 | 46,5 |
| 91 | 110,1 | 78,5 | 68,9 | 94,8 | 92 | 52,4 | 60,4 | 69,3 | 74,6 | 50,2 | 55,1 | 60,2 | 48,1 |
| 87,8 | 100,3 | 75,4 | 67,8 | 90,1 | 88,5 | 59,8 | 53,4 | 64,3 | 71,2 | 48,9 | 51,7 | 53,1 | 46,9 |
| 84,2 | 105,4 | 79,1 | 69,8 | 86,2 | 84,2 | 49,8 | 63,4 | 74,8 | 84,1 | 57,1 | 59,8 | 63,9 | 55,8 |
| 86,2 | 114,3 | 75,4 | 70,1 | 90,1 | 86,8 | 48,7 | 63,7 | 76,5 | 84,5 | 54,8 | 52,8 | 63,3 | 52 |
| 80,4 | 106,4 | 70,2 | 60,5 | 87,8 | 81,2 | 56,8 | 63,8 | 76,1 | 83,1 | 56,1 | 57,1 | 63,9 | 55,2 |
| 86,2 | 114,2 | 78,9 | 70,4 | 89 | 86,4 | 62,8 | 55,1 | 64,1 | 70,3 | 50,9 | 48,4 | 55,9 | 47,5 |
| 87,9 | 113,1 | 75,4 | 69,9 | 89,2 | 87,8 | 51,8 | 46,7 | 58,9 | 64,8 | 42,5 | 46,2 | 46,4 | 41,3 |
| 74,2 | 94,5 | 69,2 | 62,7 | 76,2 | 74,4 | 50,8 | 48,8 | 58,3 | 64,8 | 44,1 | 40,9 | 48,2 | 40,4 |
| 92,3 | 117,2 | 83,7 | 71,5 | 94,2 | 92,8 | 56,9 | 58,4 | 64,7 | 69,8 | 43,8 | 50,6 | 58,5 | 41,9 |
| 99,4 | 112,3 | 80,8 | 73,5 | 102,1 | 99,3 | 55,7 | 53,1 | 69,5 | 75,4 | 42,4 | 43,4 | 53,7 | 40,4 |
| 62,1 | 79,1 | 55,4 | 50,1 | 63,4 | 62,8 | 43,7 | 53,7 | 61,3 | 66,4 | 42,8 | 45,8 | 53,9 | 40,5 |
| 68,9 | 87,1 | 59,6 | 50,7 | 71 | 69,7 | 43,1 | 43,1 | 59,1 | 65,1 | 40,7 | 40,9 | 43,5 | 40,2 |
| 74,2 | 96,4 | 68,6 | 59,8 | 75,2 | 75,4 | 42,8 | 46,7 | 56,4 | 62,4 | 41,2 | 42,8 | 46,5 | 40,3 |
| 77,3 | 94,1 | 70,2 | 62 | 79,2 | 78,2 | 57,8 | 58,4 | 71,5 | 76,8 | 42,1 | 43,5 | 59,2 | 41,5 |
| 80 | 98,1 | 71,2 | 65,1 | 82,2 | 80,3 | 63,7 | 65,8 | 77,5 | 83,4 | 45,3 | 43,1 | 65,2 | 42,2 |
| 84,3 | 102,1 | 76,8 | 70,8 | 85,1 | 84,5 | 60,7 | 67,1 | 79,8 | 86,5 | 46,4 | 45,8 | 66,8 | 44,4 |
| 92,1 | 115,8 | 79,8 | 73,1 | 94 | 92,1 | 56,8 | 65,4 | 76,5 | 81,5 | 49,8 | 47,5 | 66,1 | 47,1 |
| 67,3 | 87,4 | 58,9 | 54,9 | 69,1 | 67,8 | 48,9 | 62,8 | 68,9 | 75,1 | 46,5 | 45 | 63,4 | 43,8 |
| 84,5 | 107,4 | 74,3 | 64,9 | 87,1 | 85,3 | 52,9 | 62,9 | 70,2 | 78,9 | 42,1 | 48,8 | 62,7 | 40,4 |
| 86,5 | 112,4 | 76,5 | 71,2 | 88,7 | 86,6 | 63,7 | 65,7 | 74,8 | 79,3 | 49,8 | 50,9 | 65,3 | 47,7 |
| 91,2 | 112,4 | 80,1 | 72,3 | 93,4 | 92,1 | 54,8 | 68,9 | 77,1 | 80,4 | 47,8 | 52,8 | 69,3 | 45,6 |
| 86,4 | 103,5 | 75,4 | 68,1 | 87,8 | 86,7 | 48,9 | 69,8 | 75,1 | 78,6 | 52,3 | 58,1 | 71,5 | 50,4 |
| 92,6 | 114,8 | 79,7 | 70,6 | 94,5 | 92,9 | 56,7 | 67,9 | 74,2 | 79,6 | 51,4 | 51 | 68,3 | 49,8 |
| 88,7 | 112,7 | 80,1 | 82,6 | 89,5 | 88,9 | 55,1 | 82,9 | 89,1 | 93,1 | 55,4 | 51,8 | 82,4 | 50,5 |
| 107,2 | 124,5 | 95,4 | 80 | 109,8 | 107,3 | 59,7 | 73,8 | 78,1 | 83,4 | 56,1 | 56,8 | 74 | 54,3 |
| 106,3 | 121,4 | 93,8 | 83,4 | 108,7 | 107,1 | 54,8 | 86,7 | 91,2 | 96,5 | 52,1 | 55 | 87,5 | 49,8 |

The obtained data of ENMG parameters were processed statistically using G-sign-test. Accidentality of prevalence of typical direction in research was considered null hypothesis, consistent prevalence of typical misalignment was considered alternative hypothesis. Columns were compared in pairs as follows: the columns with parameters of primary dysfunction area with no stimulus and those with stimulation of primary dysfunction area; those of primary dysfunction area with no stimulus and those with stimulation of secondary dysfunction area; those of primary dysfunction area with no stimulus and those with antistimulation of primary dysfunction area; those of primary dysfunction area with no stimulus and those with antistimulation of secondary dysfunction area; those of primary dysfunction area with no stimulus and those with stimulation of indifferent area not related with the preset dysfunction; those of primary dysfunction area with no stimulus and those of primary dysfunction area after the P-DTR treatment; those of parameters of secondary dysfunction area with no stimulus and those with stimulation of primary dysfunction area; those of secondary dysfunction area with no stimulus and those with stimulation of secondary dysfunction area; those of secondary dysfunction area with no stimulus and those with antistimulation of primary dysfunction area; those of secondary dysfunction area with no stimulus and those with antistimulation of secondary dysfunction area; those of secondary dysfunction area with no stimulus and those with stimulation of indifferent area not related with the preset dysfunction; those of secondary dysfunction area with no stimulus and those of secondary dysfunction area after the P-DTR treatment. In all samplings of bioelectrical activity of receptor areas, besides the columns of comparison of parameters with stimulation in indifferent areas the empirical G is less than the critical G that shows reliability of determinate shift in parameter variations.

In the specified compared pairs of primary dysfunction area with no stimulus and those of primary dysfunction area with stimulation of indifferent area; those of secondary dysfunction area with no stimulus and those of secondary dysfunction area with stimulation of indifferent area were not indicated any significant parameter shifts since the bioelectrical activity did not change significantly.

The obtained data show that:

- stimulation of the secondary dysfunction area decreases bioelectrical activity in the primary dysfunction area;

- antistimulation of secondary general dysfunction area increases bioelectrical activity in the primary dysfunction area;

- research of bioelectrical activity in the primary dysfunction areas with no stimulus and with stimulation of the area not related to this dysfunction does not indicate a significant difference;

- after P-DTR treatment activity in the area of primary receptor field tends to decrease;

- stimulation of the primary dysfunction area increases bioelectrical activity in the secondary dysfunction area;

- antistimulation of primary dysfunction area decreases bioelectrical activity in the secondary dysfunction area;

- research of bioelectrical activity in the secondary general dysfunction area with no stimulus and with stimulation of the area not related to this dysfunction does not show a significant difference;

- after P-DTR treatment activity in the area of secondary receptor field tends to decrease.

In order to assess the index muscle by stimulation of the primary receptor field with UTL and the secondary receptor field with UTL, an assessment of interferentional electroneuromyogram with skin electrodes leads was used.

In order to assess the status of primary field-associated muscle dysfunction during the primary receptor field and the secondary receptor field stimulation and the secondary field-associated muscle dysfunction during the primary receptor field and the secondary receptor field stimulation, an assessment of interferentional electroneuromyogram with skin electrodes leads was used.

The obtained ENMG data were statistically processed using the signed G-test. The null hypothesis was the randomness of prevalence of a typical direction in the studies, the alternative hypothesis was the regular prevalence of typical shifts. Pairwise comparison was performed for columns with interferential EMG parameters of the index muscle with UTL in the absence of a stimulus versus the interferential EMG parameters of the index muscle with a stimulation of the primary receptor field with UTL; for columns with interferential EMG parameters of the index muscle with UTL in the absence of a stimulus versus the interferential EMG parameters of the index muscle with a stimulation of the secondary receptor field with UTL; the parameters of field-associated primary muscle dysfunction in the absence of stimulus versus the interferential EMG parameters of field-associated primary muscle dysfunction with a stimulation of the primary receptor field; for the interferential EMG parameters of field-associated primary muscle dysfunction in the absence of stimulus versus the interferential EMG parameters of field-associated primary muscle dysfunction with a stimulation of the secondary receptor field; for the interferential EMG parameters of field-associated secondary muscle dysfunction in the absence of stimulus versus the interferential EMG parameters of field-associated primary muscle dysfunction with a stimulation of the primary receptor field; for the interferential EMG parameters of field-associated secondary muscle dysfunction in the absence of stimulus versus the interferential EMG parameters of field-associated secondary muscle dysfunction with a stimulation of the secondary receptor field.

For all the samples of interferential EMG of the muscles, the G empirical was < G critical, signifying the validity of the regular shift of parameters change.

The obtained data:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Primary field-associated muscle in the absence of stimulus | Primary field-associated muscle with a stimulation of the primary receptor field | Primary field-associated muscle with a stimulation of the secondary receptor field | Secondary field-associated muscle in the absence of stimulus | Secondary field-associated muscle with a stimulation of the primary receptor field | Secondary field-associated muscle with a stimulation of the secondary receptor field | Index muscle in the absence of stimulus | Index muscle with a stimulation of the primary receptor field | Index muscle with a stimulation of the secondary receptor field |
| 1189 | 1061 | 1247 | 1291 | 1193 | 1188 | 1100 | 552 | 562 |
| 613 | 490 | 689 | 1135 | 1044 | 1013 | 785 | 530 | 532 |
| 705 | 567 | 783 | 1360 | 1282 | 1265 | 609 | 313 | 317 |
| 864 | 731 | 938 | 727 | 641 | 647 | 654 | 203 | 221 |
| 404 | 265 | 485 | 437 | 361 | 348 | 1000 | 545 | 565 |
| 955 | 829 | 1039 | 375 | 310 | 297 | 500 | 150 | 157 |
| 1432 | 1311 | 1511 | 1022 | 962 | 953 | 966 | 540 | 551 |
| 1061 | 925 | 1157 | 504 | 430 | 418 | 744 | 245 | 250 |
| 982 | 848 | 1065 | 761 | 690 | 679 | 1006 | 549 | 561 |
| 539 | 407 | 624 | 1488 | 1408 | 1404 | 759 | 280 | 292 |
| 468 | 347 | 560 | 501 | 434 | 422 | 916 | 552 | 562 |
| 632 | 491 | 708 | 642 | 548 | 523 | 827 | 707 | 721 |
| 456 | 328 | 552 | 498 | 432 | 418 | 1281 | 467 | 498 |
| 364 | 242 | 434 | 1137 | 1042 | 1015 | 646 | 282 | 301 |
| 506 | 366 | 601 | 1231 | 1165 | 1153 | 1147 | 361 | 343 |
| 786 | 654 | 872 | 652 | 571 | 558 | 898 | 451 | 435 |
| 1331 | 1225 | 1423 | 811 | 725 | 715 | 1091 | 450 | 462 |
| 472 | 370 | 545 | 839 | 779 | 771 | 1183 | 520 | 560 |
| 1432 | 1292 | 1507 | 718 | 633 | 626 | 1269 | 653 | 704 |
| 412 | 280 | 494 | 1005 | 917 | 901 | 658 | 385 | 430 |
| 1240 | 1134 | 1318 | 1337 | 1269 | 1251 | 686 | 366 | 388 |
| 622 | 524 | 694 | 664 | 602 | 589 | 1218 | 547 | 597 |
| 1258 | 984 | 1339 | 967 | 891 | 877 | 1059 | 531 | 554 |
| 566 | 417 | 661 | 771 | 654 | 673 | 832 | 504 | 524 |
| 784 | 657 | 879 | 1255 | 1161 | 1160 | 1060 | 605 | 624 |
| 1064 | 962 | 1158 | 526 | 438 | 429 | 749 | 306 | 315 |
| 549 | 407 | 626 | 821 | 739 | 726 | 1025 | 512 | 531 |
| 1192 | 1060 | 1288 | 626 | 545 | 538 | 1020 | 633 | 718 |
| 435 | 317 | 498 | 586 | 525 | 512 | 662 | 228 | 261 |
| 1251 | 1123 | 1342 | 875 | 788 | 776 | 953 | 537 | 569 |
| 1465 | 1366 | 1526 | 1431 | 1367 | 1338 | 1180 | 528 | 533 |
| 1190 | 1089 | 1277 | 432 | 355 | 369 | 1056 | 511 | 531 |
| 699 | 557 | 765 | 1031 | 951 | 937 | 773 | 589 | 632 |
| 505 | 372 | 570 | 1309 | 1217 | 1209 | 835 | 449 | 473 |
| 541 | 439 | 626 | 1194 | 1101 | 1085 | 765 | 496 | 515 |
| 765 | 648 | 859 | 359 | 290 | 269 | 918 | 666 | 704 |
| 362 | 229 | 440 | 970 | 887 | 873 | 1108 | 746 | 776 |
| 596 | 486 | 679 | 414 | 339 | 330 | 682 | 265 | 275 |
| 1069 | 926 | 1132 | 748 | 634 | 657 | 641 | 529 | 562 |
| 1258 | 1118 | 1328 | 1198 | 1103 | 1091 | 964 | 460 | 492 |
| 1326 | 1190 | 1391 | 1115 | 1053 | 1050 | 1068 | 664 | 699 |
| 1041 | 905 | 1135 | 1082 | 1021 | 1005 | 748 | 446 | 494 |
| 435 | 286 | 508 | 458 | 360 | 348 | 1159 | 699 | 761 |
| 825 | 722 | 915 | 514 | 419 | 404 | 925 | 621 | 672 |
| 653 | 551 | 728 | 1462 | 1394 | 1377 | 1192 | 756 | 815 |
| 571 | 423 | 643 | 1022 | 964 | 926 | 792 | 279 | 291 |
| 953 | 810 | 1045 | 468 | 410 | 395 | 615 | 281 | 298 |
| 424 | 284 | 486 | 612 | 542 | 517 | 1198 | 807 | 845 |
| 374 | 225 | 465 | 1057 | 981 | 972 | 1207 | 783 | 810 |
| 657 | 514 | 730 | 1416 | 1356 | 1330 | 712 | 398 | 406 |
| 1390 | 1278 | 1486 | 1320 | 1237 | 1232 | 627 | 269 | 285 |
| 1219 | 1086 | 1292 | 960 | 874 | 857 | 1203 | 868 | 890 |
| 1276 | 1150 | 1352 | 507 | 427 | 411 | 966 | 535 | 566 |
| 734 | 636 | 798 | 1042 | 946 | 941 | 1180 | 679 | 695 |
| 1455 | 1339 | 1527 | 977 | 904 | 892 | 751 | 448 | 459 |
| 462 | 337 | 550 | 1477 | 1399 | 1357 | 840 | 493 | 511 |
| 627 | 479 | 699 | 1066 | 989 | 966 | 632 | 431 | 462 |
| 827 | 685 | 894 | 1392 | 1335 | 1328 | 767 | 525 | 559 |
| 608 | 466 | 697 | 922 | 850 | 859 | 963 | 598 | 619 |
| 548 | 432 | 606 | 1204 | 1139 | 1132 | 674 | 414 | 431 |

The obtained data indicate that:

- during stimulation of a primary receptor field, a decline of the interferential parameters of the muscle and the index muscle associated with the primary receptor field and associated with the secondary receptor field is observed.

- during stimulation of a secondary receptor field, an increase of the interferential parameters associated with the primary receptor field is observed, while those associated with the secondary receptor field of the index muscle decline.

In order to assess the status of the central nociceptive and antinociceptive mechanisms, a method of exteroceptive suppression was used with the assessment of the first and the second period of exteroceptive suppression (periods of suppression of voluntary muscle activity, respectively) before and after P-DTR treatment respectively.

The obtained data:

|  |  |  |  |
| --- | --- | --- | --- |
| ES 1 before P-DTR | ES 1 after P‑DTR | ES 2 before P-DTR | ES 2 after P‑DTR |
| 15,8 | 14,6 | 45,8 | 41,9 |
| 20,4 | 19,1 | 41,8 | 31,8 |
| 16,4 | 13,2 | 50,9 | 39,7 |
| 17,1 | 10,8 | 39,1 | 33,6 |
| 20,9 | 17,3 | 37,7 | 26,5 |
| 21,4 | 20,1 | 47,5 | 41,6 |
| 19,9 | 17,4 | 48,8 | 42,1 |
| 14,2 | 10,7 | 39,2 | 30,1 |
| 15,3 | 10,4 | 49,7 | 44,2 |
| 13,2 | 11,4 | 37,3 | 24,1 |
| 13,2 | 10,9 | 46,8 | 37,1 |
| 13,4 | 10,9 | 44,3 | 38,4 |
| 20,6 | 13,2 | 39,5 | 26,1 |
| 17,3 | 11,5 | 35,3 | 29,8 |
| 21,1 | 17,5 | 49,2 | 32,2 |
| 20,8 | 14,1 | 46,7 | 38,9 |
| 21,2 | 17,7 | 37,7 | 30,7 |
| 13,9 | 11,1 | 44,2 | 35,9 |
| 15,4 | 10,7 | 42,5 | 35,8 |
| 19,2 | 15,5 | 35,6 | 25,4 |
| 14,5 | 11,2 | 38,4 | 31,5 |
| 18,6 | 17,2 | 50,6 | 43,9 |
| 21,5 | 20,1 | 52,5 | 38,7 |
| 20,5 | 13,9 | 48,9 | 33,2 |
| 18,6 | 13,4 | 49,5 | 29,6 |
| 15,7 | 13,3 | 44,6 | 33,5 |
| 13,8 | 12,2 | 44,7 | 31,2 |
| 13,2 | 10,6 | 42,6 | 33,9 |
| 15,9 | 8,3 | 47,7 | 33,3 |
| 15,2 | 11,7 | 45,3 | 34,6 |
| 15,4 | 11 | 50,2 | 38,8 |
| 20,1 | 16,8 | 42,3 | 26,6 |
| 13,2 | 10 | 42,8 | 35,6 |
| 15,4 | 11,2 | 36,8 | 28,1 |
| 18,6 | 12,1 | 33,7 | 28,5 |
| 19,3 | 13,6 | 39,1 | 26,9 |
| 18,2 | 10,9 | 42,6 | 24,7 |
| 17,7 | 11,1 | 44,9 | 24,2 |
| 21,5 | 13,9 | 35,6 | 25,9 |
| 20,1 | 12,4 | 41,3 | 35,6 |
| 18,2 | 17 | 35,5 | 26,7 |
| 13,3 | 12,1 | 49,7 | 30,9 |
| 16,2 | 11,2 | 51,8 | 34,1 |
| 14,1 | 11,1 | 46,9 | 24,5 |
| 14,9 | 13,3 | 47,1 | 31,3 |
| 16,6 | 10,8 | 49,8 | 30 |
| 17,4 | 13,7 | 49,5 | 36,9 |
| 19,7 | 17,9 | 43,8 | 31,6 |
| 13,6 | 10,4 | 54,9 | 39,7 |
| 16,3 | 13,9 | 47,2 | 39,1 |
| 19,2 | 13,9 | 47,7 | 37,6 |
| 21,7 | 16,9 | 42,1 | 34,6 |
| 19,9 | 15,2 | 50,3 | 35,4 |
| 18,5 | 12,9 | 45,6 | 31,3 |
| 17,9 | 14,5 | 36,9 | 29,1 |
| 16,9 | 11,4 | 53,9 | 32,2 |
| 17,2 | 11,1 | 49,3 | 38 |
| 21,3 | 14,5 | 53,2 | 40,7 |
| 17,4 | 9,6 | 50,7 | 31,1 |
| 20,3 | 15,8 | 52,5 | 38,4 |
| 19,2 | 12,8 | 32,7 | 23,4 |
| 13,4 | 10 | 54,4 | 39,9 |
| 16,4 | 10,9 | 51,3 | 37,9 |
| 13,6 | 8,9 | 44,3 | 29,3 |
| 15,1 | 10,7 | 47,9 | 37,5 |
| 18,7 | 13,5 | 50,5 | 37,8 |
| 16,2 | 11,5 | 51,7 | 35,4 |
| 15,3 | 11,3 | 37,4 | 30,9 |
| 18,9 | 13,2 | 51,5 | 35,6 |
| 18,8 | 14,8 | 52,7 | 39,1 |
| 16,8 | 14,2 | 37,1 | 29 |
| 19,2 | 13,4 | 43,7 | 27,3 |
| 15,9 | 14,4 | 43,9 | 26,9 |
| 16,9 | 15,1 | 53,4 | 34,3 |
| 16,4 | 12,3 | 38,8 | 26,5 |
| 21,9 | 16,7 | 41,7 | 35,9 |
| 14,9 | 13,1 | 48,4 | 36,1 |
| 18,2 | 10,5 | 44,4 | 24,9 |
| 14,1 | 11,4 | 37,8 | 24,9 |
| 13,7 | 10,7 | 34,3 | 27 |
| 13,2 | 11,1 | 52,9 | 37,9 |
| 20,2 | 13,4 | 48,5 | 37,1 |
| 19,6 | 12,1 | 42,1 | 32,3 |
| 19,6 | 13,3 | 42,4 | 31,4 |
| 13,3 | 10,8 | 45,2 | 35,6 |
| 15,7 | 12,3 | 46,2 | 35,2 |
| 18,6 | 12,8 | 32,8 | 25,9 |
| 15,4 | 13,9 | 53,6 | 39,6 |
| 20,9 | 17,3 | 54,1 | 38,4 |
| 17,1 | 10,5 | 41,5 | 29,9 |
| 15,6 | 9,9 | 40,7 | 29,3 |
| 17,2 | 15,5 | 42,7 | 31,8 |
| 18,9 | 15,5 | 34,1 | 27,3 |
| 17,1 | 11,4 | 35,7 | 23,2 |
| 15,3 | 10,3 | 52,4 | 32,4 |
| 14,7 | 10,7 | 43,8 | 26,5 |
| 18,2 | 13,5 | 44,5 | 37,7 |
| 16,8 | 12,6 | 40,6 | 33,7 |
| 18,7 | 16,3 | 39,1 | 23,8 |
| 18,9 | 13,4 | 32,9 | 26,1 |
| 17,3 | 12,6 | 53,9 | 30,5 |
| 17,1 | 13,7 | 34,7 | 26,9 |
| 17,3 | 11,5 | 39,2 | 34,4 |
| 16,8 | 11,6 | 49,1 | 36,9 |
| 16,8 | 14,1 | 51,2 | 41,5 |
| 15,9 | 13,4 | 45,2 | 35 |
| 13,3 | 10,1 | 38,9 | 33,9 |
| 17,3 | 11,3 | 51,7 | 41,8 |
| 14,5 | 11 | 39,7 | 36,3 |
| 19,8 | 13,1 | 46,3 | 33,2 |
| 16,8 | 12,1 | 47,7 | 29,7 |
| 18,9 | 13,3 | 38,1 | 23,5 |
| 14,9 | 10,2 | 51,1 | 35,5 |
| 19,6 | 17,4 | 35,2 | 28 |
| 21,5 | 16,7 | 40,8 | 30,8 |
| 21,2 | 19,7 | 48,6 | 39,2 |
| 21,3 | 16,7 | 33,9 | 26,4 |
| 13,6 | 11,8 | 54,2 | 37,9 |
| 20,7 | 19,2 | 33,3 | 27,8 |
| 17,6 | 13,1 | 34,9 | 28,1 |
| 15,2 | 10,5 | 42,9 | 26,6 |
| 16,4 | 14,9 | 46,1 | 28,8 |
| 17,6 | 12,8 | 36,1 | 29,3 |
| 13,7 | 11,4 | 47,9 | 32,2 |
| 20,5 | 13,2 | 44,9 | 36,9 |
| 18,1 | 10,9 | 39,4 | 30 |
| 15,4 | 10,6 | 53,8 | 38,7 |
| 20,2 | 13,6 | 34,3 | 27,4 |
| 19,6 | 13 | 47,9 | 37,6 |
| 13,1 | 10,7 | 51 | 33,6 |
| 18,4 | 15,1 | 46,9 | 37,7 |
| 17,5 | 15,2 | 48,7 | 40,2 |
| 19,4 | 13,9 | 34,5 | 27,6 |
| 19,8 | 15,1 | 34,9 | 25,9 |
| 20,5 | 14,3 | 49,4 | 30,6 |
| 19,4 | 14,8 | 49,3 | 34,1 |
| 15,7 | 12,3 | 36,8 | 30,7 |
| 17,5 | 15,8 | 35,1 | 28,9 |
| 18,2 | 13,7 | 42,3 | 35,6 |
| 13,4 | 11,4 | 43,2 | 31,7 |
| 21,8 | 20,6 | 32,7 | 25,7 |
| 19,2 | 15,5 | 36,4 | 31,2 |
| 21,6 | 16 | 38,7 | 33,3 |
| 19,1 | 16,4 | 46,5 | 40,5 |
| 13,6 | 11,1 | 45,4 | 39,3 |
| 21,6 | 19,4 | 51,4 | 42,3 |
| 19,3 | 14,5 | 49,6 | 33,2 |
| 18,6 | 15,1 | 39,3 | 25,8 |
| 21,5 | 18,8 | 49,4 | 36,8 |
| 13,5 | 10,4 | 47,8 | 34,4 |
| 20,5 | 17,8 | 42,4 | 29,2 |

The obtained data of ES1 and ES2 parameters were processed statistically using the signed G-test. The null hypothesis was the randomness of prevalence of a typical direction in the studies, the alternative hypothesis was the regular prevalence of typical shifts. Pairwise comparison was performed for columns with ES1 duration before P-DTR treatment versus ES1 after P-DTR treatment; for columns with ES2 duration before P-DTR treatment versus ES2 after P-DTR treatment. For all the samples of interferential EMG of the muscles, the G empirical was < G critical, signifying the validity of the regular shift of parameters change.

Assessment of ES parameters status before and after P-DTR treatment has shown a trend to ES1 and ES2 parameters shortening, suggesting a decrease in inhibitory activity of interneurons at the brain stem level that provide the nociceptive reactions. It suggests that the use of P-DTR method influences not only the peripheral pain component, but also the central nociceptive structures, that clinically promotes a decrease of pain syndrome.

In order to assess the status of the skin-vegetative reactions of the patient, the evoked skin-sympathetic potential of upper and lower extremities was used; the calculations employed the amplitude of the second ESSP in mV and latency in seconds (the time from the start of the stimulus until vegetative response) before and after P-DTR treatment, respectively.

The following results were obtained:

|  |  |  |  |
| --- | --- | --- | --- |
| А2 before P-DTR treatment | А2 after P-DTR treatment | Latency before P‑DTR treatment | Latency after P‑DTR treatment |
| 3,58 | 3,47 | 1,64 | 1,63 |
| 3,59 | 3,58 | 1,66 | 1,66 |
| 3,38 | 3,5 | 1,56 | 1,56 |
| 2,99 | 3,01 | 1,64 | 1,63 |
| 3,14 | 3,16 | 1,44 | 1,46 |
| 2,92 | 2,94 | 1,67 | 1,67 |
| 2,97 | 2,7 | 1,50 | 1,51 |
| 3,59 | 3,62 | 1,67 | 1,68 |
| 3,39 | 3,41 | 1,45 | 1,45 |
| 3,16 | 3,13 | 1,53 | 1,53 |
| 2,93 | 2,92 | 1,54 | 1,55 |
| 3,33 | 3,28 | 1,58 | 1,57 |
| 3,12 | 3,08 | 1,45 | 1,46 |
| 2,97 | 3,21 | 1,42 | 1,43 |
| 3,51 | 3,64 | 1,58 | 1,58 |
| 3,28 | 3,07 | 1,49 | 1,49 |
| 2,97 | 2,96 | 1,65 | 1,66 |
| 3,58 | 3,56 | 1,45 | 1,45 |
| 2,97 | 2,84 | 1,53 | 1,54 |
| 3,35 | 3,36 | 1,57 | 1,57 |
| 2,96 | 2,91 | 1,48 | 1,48 |
| 3,27 | 3,14 | 1,56 | 1,56 |
| 3,38 | 3,29 | 1,54 | 1,53 |
| 2,96 | 2,75 | 1,52 | 1,52 |
| 3,22 | 3,19 | 1,64 | 1,62 |
| 3,52 | 3,47 | 1,52 | 1,61 |
| 2,98 | 2,83 | 1,69 | 1,72 |
| 3,36 | 3,12 | 1,52 | 1,49 |
| 3,12 | 3,16 | 1,63 | 1,65 |
| 3,29 | 3,9 | 1,46 | 1,43 |
| 3,44 | 3,6 | 1,54 | 1,52 |
| 3,05 | 3,17 | 1,46 | 1,48 |
| 3,53 | 3,59 | 1,49 | 1,49 |
| 3,12 | 3,49 | 1,69 | 1,58 |
| 3,46 | 3,21 | 1,50 | 1,75 |
| 3,47 | 3,47 | 1,43 | 1,43 |
| 3,56 | 3,63 | 1,59 | 1,55 |
| 3,11 | 3,98 | 1,89 | 1,69 |
| 3,26 | 3,24 | 1,60 | 1,60 |
| 3,33 | 2,8 | 1,59 | 1,60 |
| 3,07 | 3,4 | 1,52 | 1,52 |
| 3,44 | 3,15 | 1,44 | 1,44 |
| 3,37 | 3,67 | 1,69 | 1,58 |
| 3,46 | 3,2 | 1,68 | 1,70 |
| 3,34 | 3,18 | 1,51 | 1,48 |
| 3,19 | 3,21 | 1,55 | 1,55 |
| 3,04 | 2,86 | 1,60 | 1,63 |
| 3,27 | 3,14 | 1,58 | 1,59 |
| 3,25 | 3,17 | 1,70 | 1,56 |
| 3,49 | 3,36 | 1,61 | 1,61 |
| 3,51 | 3,49 | 1,54 | 1,46 |
| 3,59 | 3,53 | 1,54 | 1,56 |
| 3,56 | 3,1 | 1,75 | 1,66 |
| 3,19 | 3,29 | 1,51 | 1,52 |
| 2,98 | 3,12 | 1,61 | 1,63 |
| 3,16 | 3,35 | 1,62 | 1,59 |
| 3,19 | 3,49 | 1,56 | 1,58 |
| 3,55 | 3,41 | 1,53 | 1,55 |
| 3,49 | 3,24 | 1,49 | 1,51 |
| 3,52 | 3,45 | 1,55 | 1,53 |
| 2,93 | 2,89 | 1,48 | 1,51 |
| 3,38 | 3,54 | 1,69 | 1,64 |
| 3,41 | 3,49 | 1,44 | 1,42 |
| 3,42 | 3,41 | 1,67 | 1,69 |
| 3,55 | 3,51 | 1,48 | 1,46 |
| 3,49 | 3,46 | 1,72 | 1,73 |
| 3,44 | 3,49 | 1,54 | 1,58 |
| 3,43 | 3,45 | 1,72 | 1,76 |
| 3,48 | 3,54 | 1,51 | 1,53 |
| 3,33 | 3,27 | 1,54 | 1,59 |
| 3,37 | 3,38 | 1,68 | 1,67 |
| 3,48 | 3,46 | 1,47 | 1,49 |
| 3,41 | 3,12 | 1,64 | 1,81 |
| 3,31 | 3,11 | 1,49 | 1,46 |
| 3,37 | 3,34 | 1,72 | 1,71 |
| 3,31 | 3,28 | 1,51 | 1,52 |
| 3,29 | 3,26 | 1,63 | 1,62 |
| 3,05 | 3,07 | 1,57 | 1,53 |
| 3,19 | 3,28 | 1,65 | 1,68 |
| 3,54 | 3,51 | 1,60 | 1,62 |
| 3,24 | 3,28 | 1,56 | 1,59 |
| 3,05 | 3,07 | 1,69 | 1,66 |
| 3,03 | 2,88 | 1,73 | 1,86 |
| 3,52 | 3,55 | 1,55 | 1,59 |
| 3,31 | 3,49 | 1,47 | 1,49 |
| 3,17 | 3,19 | 1,51 | 1,54 |
| 3,44 | 3,65 | 1,72 | 1,77 |
| 3,27 | 3,16 | 1,63 | 1,67 |
| 3,45 | 3,49 | 1,50 | 1,52 |
| 3,31 | 3,3 | 1,46 | 1,46 |
| 3,01 | 2,96 | 1,54 | 1,56 |
| 3,55 | 3,59 | 1,67 | 1,67 |
| 3,15 | 3,15 | 1,50 | 1,51 |
| 3,58 | 3,67 | 1,54 | 1,53 |
| 3,25 | 3,17 | 1,63 | 1,68 |
| 3,42 | 3,46 | 1,72 | 1,71 |
| 3,18 | 3,16 | 1,73 | 1,74 |
| 3,09 | 3,14 | 1,54 | 1,51 |
| 3,46 | 3,35 | 1,63 | 1,69 |
| 3,24 | 3,21 | 1,73 | 1,72 |
| 3,14 | 3,17 | 1,68 | 1,68 |
| 2,91 | 3,05 | 1,47 | 1,39 |
| 3,42 | 3,38 | 1,54 | 1,52 |
| 3,58 | 3,54 | 1,58 | 1,56 |
| 3,54 | 3,52 | 1,45 | 1,44 |
| 3,58 | 3,54 | 1,67 | 1,69 |
| 3,15 | 3,33 | 1,57 | 1,58 |
| 3,09 | 3,12 | 1,62 | 1,63 |
| 3,19 | 3,23 | 1,74 | 1,73 |
| 3,16 | 3,19 | 1,69 | 1,71 |
| 3,04 | 2,84 | 1,42 | 1,46 |
| 2,95 | 2,93 | 1,65 | 1,68 |
| 3,12 | 3,13 | 1,71 | 1,70 |
| 3,07 | 3,09 | 1,55 | 1,56 |
| 3,55 | 3,56 | 1,74 | 1,72 |
| 3,52 | 3,53 | 1,59 | 1,61 |
| 3,18 | 3,04 | 1,59 | 1,57 |
| 3,09 | 2,84 | 1,74 | 1,71 |
| 3,03 | 3,02 | 1,50 | 1,50 |
| 3,11 | 3,12 | 1,63 | 1,63 |
| 3,24 | 3,16 | 1,60 | 1,60 |
| 3,41 | 3,45 | 1,55 | 1,56 |
| 3,35 | 3,28 | 1,59 | 1,57 |
| 3,54 | 3,52 | 1,49 | 1,50 |
| 2,94 | 2,96 | 1,45 | 1,46 |
| 3,03 | 3,08 | 1,69 | 1,69 |
| 3,27 | 3,29 | 1,45 | 1,44 |
| 3,29 | 3,26 | 1,74 | 1,72 |
| 3,55 | 3,51 | 1,62 | 1,64 |
| 3,24 | 3,21 | 1,46 | 1,45 |
| 3,19 | 3,26 | 1,42 | 1,46 |
| 3,03 | 3,24 | 1,49 | 1,45 |
| 3,18 | 3,06 | 1,51 | 1,54 |
| 3,18 | 3,08 | 1,45 | 1,46 |
| 3,47 | 3,25 | 1,70 | 1,73 |
| 3,36 | 3,28 | 1,49 | 1,48 |
| 3,17 | 3,16 | 1,61 | 1,62 |
| 3,06 | 3,05 | 1,46 | 1,44 |
| 3,41 | 3,43 | 1,59 | 1,57 |
| 3,34 | 3,39 | 1,59 | 1,61 |
| 3,26 | 3,28 | 1,74 | 1,72 |
| 3,49 | 3,52 | 1,59 | 1,58 |
| 3,06 | 3,15 | 1,46 | 1,44 |
| 3,42 | 3,46 | 1,69 | 1,67 |
| 3,52 | 3,51 | 1,69 | 1,70 |
| 3,52 | 3,57 | 1,66 | 1,63 |
| 3,33 | 3,46 | 1,49 | 1,45 |
| 3,21 | 3,13 | 1,79 | 1,73 |
| 3,22 | 3,17 | 1,57 | 1,60 |
| 3,32 | 3,18 | 1,68 | 1,65 |
| 3,38 | 3,34 | 1,46 | 1,43 |

The obtained numerical results of electroneuromyography studies were analyzed by statistical processing using signed G-test. The null hypothesis was the randomness of prevalence of a typical direction in the studies, the alternative hypothesis was the regular prevalence of typical shifts. No significant changes of ESSP parameters were obtained.

Based on the results of analysis of evoked skin-sympathetic potential (ESSP), the changes are oppositely directed, which is related to involvement or lack of involvement of vegetative nervous system in the pathological process of a given patient.

**Conclusion:**

Electroneuromyography study of the primary and secondary receptor field before P‑DTR treatment has shown their relationship, i.e., the signs of paired relationship of the receptor fields with a compensatory influence on each other were revealed for the first time. During the stimulation of a primary receptor field, a direct relationship is observed between the increase of the amplitudes of the obtained potentials of bioelectrical activity of the primary and secondary receptor fields; during the stimulation of the secondary receptor field an inverse relationship is observed between the increase in amplitudes of bioelectrical activity of the primary and secondary receptor fields, which also signifies the compensatory role of the secondary dysfunctional field towards the primary field.

The influence of that receptor field on the indicator muscle (using UTL) and the influence of the receptor field on associated muscles were also studied. The clinical inhibition of muscles during a muscle test in P-DTR correlates with a decrease of EMG data.

During the study of normal receptor fields of various body areas, a tremendous parameters spread was observed. Additional studies are required to investigate the normal bioelectrical activity at various body areas of the patient.

Assessment of exteroceptive suppression (ES) during P-DTR treatment has shown signs of shortening of ES1 and ES2 duration, suggesting a stabilization of inhibitory activity of the brain stem level interneurons providing the nociceptive reactions. This allows to suggest that the use of the method influences the central mechanisms of the pain syndrome and leads to normalization of the interneuron activity at the brain stem level.