



physioflux

PRODUCTS
CATALOGUE

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PHYSIOPLUX

PRODUCTS

INTRODUCTION

ADVANCED SYSTEM FOR PHYSIOTHERAPY TRAINING

physioplux line of products includes 3 different solutions for exercise training in physiotherapy & sports, that uses of electromyography EMG sensors and biofeedback logic to ensure a more objective training process and faster recoveries.

Why use it?

On electromyographic biofeedback, electrical signals resulting from muscle activity are translated by the biofeedback software in appealing real-time graphics and animations. Biofeedback guided training has an important role to facilitate the correct muscle activation, especially during the initial learning stages.

Its usage empowers the patients and increase their motivation and adherence to treatment, contributing to the success of the intervention and maintenance of the results.

physioplux has a major philosophy of ease of use, flexibility, reliability and portability. The operating principle of physioplux is based on three principles: to connect, acquire and visualize.



What's the challenge?

Get objective results in order to quantify the improvements and keep patients motivated, decreasing dropouts.

Awareness and perception of the muscular activation and the body movement is facilitated, and the goals easily achieved.

physioplux

	Dynamic Stability Shoulder	Dynamic Stability Patellofemoral	ACL	Pelvic Floor Training Men/Women	Rapid Contractions	Open Line	Dynamic Stability Generic	Biofeedback Generic	Generic Balance	Post-Operative Recovery
Shoulder Impingement	✓						✓			
Shoulder Instability	✓						✓			
Shoulder Pain	✓						✓	✓		
Scapular Muscle Imbalance	✓						✓	✓		
Work-Related Neck And Shoulder Pain	✓						✓	✓		
Mygrane Headache							✓	✓		
Meniscal Repair							✓	✓		✓
Acl Reconstruction			✓				✓	✓		✓
Patellofemoral Pain Syndrome		✓					✓	✓	✓	✓
Low Back Pain							✓	✓		
Temporomandibular Disorders							✓	✓		
Hand Dystonia								✓		
Fibromyalgia Syndrome							✓	✓		
Rheumatoid Arthritis							✓	✓		
Acute Sciatic Pain							✓	✓		✓
Urinary Incontinence (Men, Women, Post Child Birth)				✓	✓	✓		✓		
Urinary Incontinence (Patients W/ Multiple Sclerosis)				✓	✓	✓		✓		
Stress Urinary Incontinence				✓	✓	✓		✓		
Fecal incontinence (children/adults)				✓	✓	✓		✓		
Vulvar vestibulitis				✓	✓	✓		✓		
Erectile dysfunction								✓		
Anxiety								✓		
Cerebral Palsy							✓	✓		✓
Stroke recovery							✓	✓	✓	
Upper Motor Neuron Syndrome								✓		
Spastic Movement Disorder							✓	✓		
Muscle imbalances							✓	✓	✓	
Muscle Weakness					✓	✓	✓	✓	✓	✓
Lack of muscle control							✓			

PHYSIOPLUX CLINICAL

It's a certified Medical Device (CE and FDA), designed for physiotherapy practices. It allows to monitor up to 4 muscles at the same time, and to define specific exercise targets for each muscle individually, presenting real-time visual and sound feedback.

It includes biofeedback applications for shoulder, knee, pelvic floor conditions and generic, covering two thirds of the typical muscular injuries (in the generic apps the user can define what muscles to assess and what kind of graphic suits best that specific needs).

Initial clinical studies show that the average recovery time from a shoulder injury using physioplux Clinical is ~50% less from normal treatment and, more impressively, that the 24 months recurrence rate from treatments drops from ~40% just to ~11% with physioplux Clinical biofeedback based treatments (Santos, Carnide & Matias, in publication).



PHYSIOPLUX TRAINER

It's an easy to use device, designed to guide and monitor homework prescribed exercises.

Patient: Follow the physiotherapist prescription and exercise correctly at home.

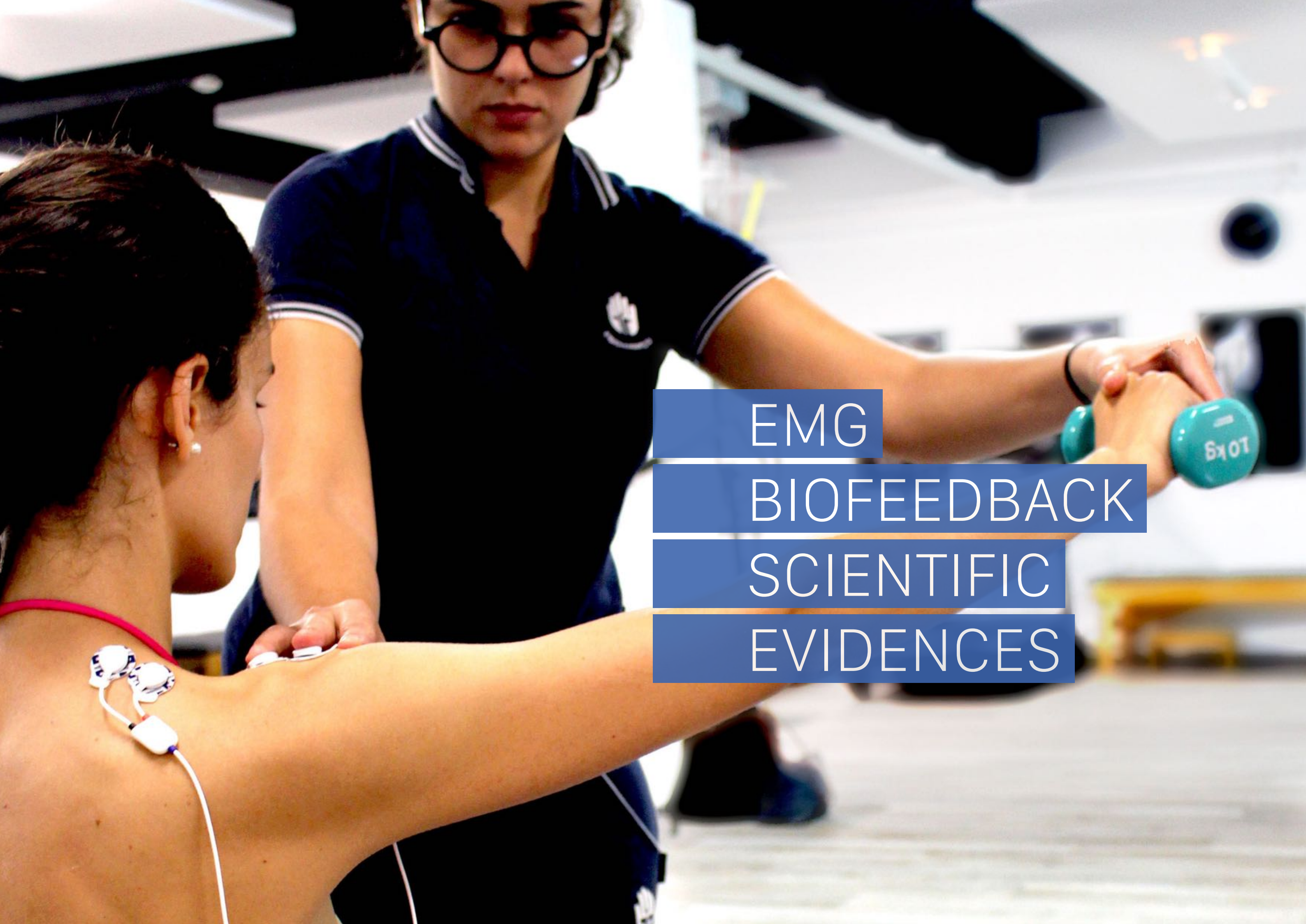
Physiotherapist: Change prescriptions remotely and monitor the patient training stages. This system ensures quality and training accuracy even outside the clinic.



PHYSIOPLUX GO

Exercise with a simple and generic biofeedback tool at home.

It allows monitoring 2 muscles at the same time and to define specific exercise targets for each muscle, presenting real-time visual and sound feedback.



EMG

BIOFEEDBACK

SCIENTIFIC

EVIDENCES

EMG BIOFEEDBACK

EMG biofeedback has been tested, analyzed and proven to be effective in several conditions and pathologies. Here is some data:

Evidence proven

Used alone for **Temporomandibular Disorders, EMG biofeedback improves pain, pain-related disability, and mandibular functioning, decreasing the activity in both masseter and temporal muscles, and when used in combination with other treatments, such as intraoral applications the effect is enhanced.**

1. Gardea, M.A., Gatchel, R.J., Mishra, K.D. (2001). Long-term efficacy of biobehavioral treatment of temporomandibular disorders. *Journal of Behavioral Medicine*, 24(4), 341-59.
2. Turk, D.C., Zaki, H.S., & Rudy, T.E. (1993). Effects of intraoral appliance and biofeedback/stress management alone and in combination in treating pain and depression in patients with temporomandibular disorders. *Journal of Prosthetic Dentistry*, 70(2), 158-64.
3. Gardea, M.A., Gatchel, R.J., Mishra, K.D. (2001). Long-term efficacy of biobehavioral treatment of temporomandibular disorders. *Journal of Behavioral Medicine*, 24(4), 341-59.
4. Turk, D.C., Rudy, T.E., Kubinski, J.A., Zaki, H.S., & Greco, C.M. (1996). Dysfunctional patients with temporomandibular disorders: Evaluating the efficacy of a tailored treatment protocol. *Journal of Consulting Clinical Psychology*, 64(1), 139-46.
5. Medlicott, M., Harris, S. (2006). A Systematic Review of the Effectiveness of Exercise, Manual Therapy, Electrotherapy, Relaxation Training, and Biofeedback in the Management of Temporomandibular Disorder. *Physical Therapy*, 86(7):955-973.
6. Criado, L., et al. (2016). Electromyographic biofeedback training for reducing muscle pain and tension on masseter and temporal muscles: A pilot study. *J Clin Exp Dent*, 8(5):e571-6.

Relaxation training with EMG biofeedback was found to be just as effective as propranolol in treating **Migraine Headache but more effective during the first year post-treatment.**

7. Kaushik, R., Kaushik, R.M., Mahajan, S.K., & Rajesh, V. (2005). Biofeedback-assisted diaphragmatic breathing and systematic relaxation versus propranolol in long term prophylaxis of migraine. *Complementary Therapies in Medicine*, 13(3), 165-17.
8. Silberstein, S.D. (2000). Practice parameter: Evidence-based guidelines for migraine headache (an evidence-based review): Report of the quality standards subcommittee of the American Academy of Neurology. *Neurology*, 55, 754-762.

EMG biofeedback may be useful in facilitating the reduction in neck muscle activation and therefore decrease pain. Is is also associated with increased observed work ability and self-rated vitality.

Ma et al., also found that pain was reduced significantly more in the biofeedback group, and results were maintained at 6 months follow-up. Cervical erector spinae and Upper Trapezius muscles activity showed significant reductions postintervention. Six weeks of biofeedback training produced more favorable outcomes in reducing pain and improving muscle activation of neck muscles in patients with **work-related neck and shoulder pain.**

9. Dellve, L., et al. (2011). Myofeedback training and intensive muscular strength training to decrease pain and improve work ability among female workers on long-term sick leave with neck pain: a randomized controlled trial. *Int Arch Occup Environ Health*, 84:335-346.9-
10. Dellve L, et al. (2011). Myofeedback training and intensive muscular strength training to decrease pain and improve work ability among female workers on long-term sick leave with neck pain: a randomized controlled trial. *Int Arch Occup Environ Health*, 84:1-12.
11. Voerman GE, et al. (2007). Effects of ambulant myofeedback training and ergonomic counselling in female computer workers with work-related neck-shoulder complaints: a randomized controlled trial. *J Occup Rehabil*, 17(1):137-152.
12. Ma, C. et al. (2011). Comparing Biofeedback With Active Exercise and Passive Treatment for the Management of Work-Related Neck and Shoulder Pain: A Randomized Controlled Trial. *Arch Phys Med Rehabil*, 92:849-58.

The learning of complete selective activation of both the lower and the upper serratus anterior of one subject, and selective activation of either the upper or lower serratus anterior by five subjects designates the promising clinical application of EMG biofeedback for **scapular muscle imbalance treatment.**

13. Holtermann, A. et al. (2010). The use of EMG biofeedback for learning of selective activation of intra-muscular parts within the serratus anterior muscle - a novel approach for rehabilitation of scapular muscle imbalance. *Journal of Electromyography and Kinesiology*, 20:359-365.
14. Lim, O., et al. (2014). Effect of Selective Muscle Training Using Visual EMG Biofeedback on Infraspinatus and Posterior Deltoid. *Journal of Human Kinetics*, 44: 83-90.
15. Santos, C., Matias, R. (2007). A intervenção da Fisioterapia em utentes com Síndrome de Conflito Sub-acromial e Instabilidade da Gleno-umeral: efectividade e pressupostos. *ESSfisionline*, 3(4): 14-35.
16. Santos, C. (2011). Protocolo de fisioterapia, com auxílio de Biofeedback eletromiográfico, em utentes com disfunções do ombro: efeitos na dor, funcionalidade e estabilidade dinâmica. (Dissertação de Mestrado em Fisioterapia).
17. 17- Middaugh, S. et al. (2013). EMG Biofeedback and Exercise for Treatment of Cervical and Shoulder Pain in Individuals with a Spinal Cord Injury: A Pilot Study. *Top Spinal Cord Inj Rehabil*, 19(4):311-323.

Evidence proven

EMG biofeedback is recommended as an adjunct to conservative management for returning patients to premorbid activity levels and for minimizing or alleviating symptoms.

A scapula-focused treatment protocol supported by real-time EMG biofeedback, with a motor relearning based intervention, is shown to be effective for **Subacromial Impingement Syndrome and Shoulder Instability treatment. Results demonstrate that the protocol was effective achieving all the discharge criteria's with a mean total time of treatment (6.45 weeks for SIS and 5.83 for SJI) that support its clinical use, with 9.7% recurrence rate (24M follow-up) and zero dropouts during the intervention period.**

18. Huang, H. et al. (2013). EMG biofeedback effectiveness to alter muscle activity pattern and scapular kinematics in subjects with and without shoulder impingement. *Journal of Electromyography and Kinesiology*, 23: 267-274.
19. Gibson, K., et al. (2004). The Effectiveness of Rehabilitation for Nonoperative Management of Shoulder Instability: A Systematic Review. *Journal of Hand Therapy*, 229-242.
20. Santos, C., Carnide, F., Matias, R. Effective Scapula-focused Physiotherapy Protocol for Subjects with Shoulder Dysfunctions. *in prep.*

EMG biofeedback showed improvement from 37 to 93% in handwriting, alleviation of discomfort, and pain in patients with **Hand Dystonia (writer's cramp).**

21. Deepak, K.K., & Behari, M. (1999). Specific muscle EMG biofeedback for hand dystonia. *Applied Psychophysiology and Biofeedback*, 24(4), 267-80.

An EMG-assisted stretching biofeedback training protocol for **Low Back Pain can result in normalization of the flexion-relaxation phenomenon, so that these subjects are comparable to a pain-free control group. EMG biofeedback may also be proposed as an additional intervention to exercise in low back pain.**

22. Neblett, M. (2016). Surface Electromyographic (SEMG) Biofeedback for Chronic Low Back Pain. *Healthcare*, 4, 27.
23. Neblett, M., et al. (2010). Correcting Abnormal Flexion-Relaxation in Chronic Lumbar Pain: Responsiveness to a New Biofeedback Training Protocol. *Clin J Pain*, 26(5): 403-409.
24. Angoules, A., et al. (2008). Effectiveness of Electromyographic Biofeedback in the Treatment of Musculoskeletal Pain. *Orthopedics*, (31) 10: 980-984.

The benefit of EMG biofeedback and pelvic floor exercises for **Vulvar Vestibulitis has been demonstrated, with reductions in pain and approximately 70% of the participants able to resume sexual activity without discomfort.**

25. Glazer, H.I., Rodke, G., Swencionis, C., Hertz, R., & Young, A.W. (1995). Treatment of vulvar vestibulitis syndrome with electromyographic biofeedback of pelvic floor musculature. *Journal of Reproductive Medicine*, 40(4), 283-290.
26. McKay, E., Kaufman, R.H., Doctor, U., Berkova, Z., Glazer, H., & Redko, V. (2001). Treating vulvar vestibulitis with electromyographic biofeedback of pelvic floor musculature. *Journal of Reproductive Medicine*, 46(4), 337-342.

An intervention for **Fecal Incontinente, including soft tissue techniques, EMG biofeedback, strength training, relaxation training, patient education, and a home program, showed improved bowel continence and greater control of the pelvic-floor muscles, resulting in greater confidence and comfort and less restriction in the patient's physical relationship with the partner.**

27. Capellini, M., et al. (2006). Pelvic Floor Exercises with Biofeedback for Stress Urinary Incontinence. *Int Braz J Urol*, 32: 462-9.

Treatment of **Stress Urinary Incontinence with pelvic floor exercises associated to EMG biofeedback is an effective approach, with maintenance of the ^results at 3 months follow-up. The association with electrical stimulation with a "cure" and "cure/improvement" rate up to 70% and 97% respectively.**

28. Capellini, M., et al. (2006). Pelvic Floor Exercises with Biofeedback for Stress Urinary Incontinence. *Int Braz J Urol*, 32: 462-9.
29. Rett, M., et al. (2007). Management of Stress Urinary Incontinence With Surface Electromyography-Assisted Biofeedback in Women of Reproductive Age. *Physical Therapy*, 87(2): 136-142.
30. Ferreira, M., Santos, P. (2011). Evidência Científica Baseada nos Programas de Treino dos Músculos do Pavimento Pélvico. *Acta Med Port*, 24: 309-318.

Parekh et al. and Burgio et al. foud that EMG biofeedback training prior to radical prostatectomy hastens the recovery of urine control and decreases the severity of incontinence after surgery.

In addition, MacDonald et al., found that men receiving EMG biofeedback pelvic floor training were more likely to achieve continence than those with no training - **Urinary Incontinence Men.**

31. MacDonald, R., Fink, H.A., Huckabay, C., Monga, M., & Wilt, T.J. (2007). Pelvic floor muscle training to improve urinary incontinence after radical prostatectomy: A systematic review of effectiveness. *BJU International*, 100(1), 76-81.
32. Parekh, A.R., Feng, M.I., Kirages, D., Bremner, H., Kaswick, J., & Aboseif, S. (2003). The role of pelvic floor exercises on post-prostatectomy incontinence. *The Journal of Urology*, 170(1), 130-133.
33. Burgio, K.L., Goode, P.S., Urban, D.A., Umlauf, M.G., Locher, J.L., Bueschen, A., et al. (2006). Preoperative biofeedback-assisted behavioral training to decrease post-prostatectomy incontinence: A randomized, controlled trial. *The Journal of Urology*, 175(1), 196-201.

EMG biofeedback is effective for reducing **Urinary Incontinence and nocturia in older women.**

34. Tadic, S.D., Zdaniuk, B., Griffiths, D., Rosenberg, L., Schafer, W., & Resnick, N.M. (2007). Effect of biofeedback on psychological burden and symptoms in older women with urge urinary incontinence. *Journal of the American Geriatric Society*, 55(12), 2010-2005.
35. Johnson, T.M.I., Burgio, K.L., Redden, D.T., Wright, K.C., & Goode, P.S. (2005). Effects of behavioral and drug therapy on nocturia in older incontinent women. *Journal of the American Geriatric Society*, 53(5), 846-850.

Evidence proven

After child birth, there is a significant effect on reducing or resolving Urinary Incontinence with an EMG biofeedback exercise programe.

36. Haddow, G., Watts, R., & Robertson, J. (2005). Effectiveness of a pelvic floor muscle exercise program on urinary incontinence following childbirth. *International Journal of Evidence-Based Healthcare*, 3(5), 103-146.

EMG biofeedback for lower urinary tract dysfunction, especially in combination with neuromuscular electrical stimulation, decreased incontinence episodes in patients with Multiple Sclerosis.

37. McClurg, D., Ashe, R.G., & Lowe-Strong, A.S. (2007). *Neuromuscular electrical stimulation and the treatment of lower urinary tract dysfunction in multiple sclerosis: A double-blind, placebo-controlled, randomised clinical trial. Neurourology and Urodynamics*, (Epub, ahead of print).

Pelvic floor exercise home training with EMG biofeedback is affective in alleviating the symptomes, with results in 85% of the patients in one for the studies.

38. Aukee, P., Immonen, P., Laaksonen, D.E., Laippala, P., Penttinen, J., & Airaksinen, O. (2004). The effect of home biofeedback training on stress incontinence. *Acta Obstetrica et Gynecologica Scandinavica*, 83(10), 973-977.
39. Hui, E., Lee, P.S., & Woo, J. (2006). Management of urinary incontinence in older women using videoconferencing versus conventional management: A randomized controlled trial. *Journal of Telemedicine and Telecare*, 12(7), 343-347.
40. Hirsch, A.I, et al. (1999). Treatment of Female Urinary Incontinence with EMG-Controlled Biofeedback Home Training. *International Urogynecology Journal*, 10(1): 7-10.

EMG Biofeedback has been used for Fecal Incontinence in children and for that occurring after surgery for anorectal malformations and results in clinical improvement in children with Fecal Incontinence.

41. Iwai, N., Iwata, G., Kimura, O., & Yanagihara, J. (1997). Is a new biofeedback therapy effective for fecal incontinence in patients who have anorectal malformations? *Journal of Pediatric Surgery*, 32(11), 1626-1629.
42. Hibi, M., Iwai, N., Kimura, O., Sasaki, Y., & Tsuda, T. (2003). Results of biofeedback therapy for fecal incontinence in children with encopresis and following surgery for anorectal malformations. *Diseases of the Colon and Rectum*, 46(10 Suppl), S54-8.
43. Leung, M.W., Wong, B.P., Leung, A.K., Cho, J.S., Leung, E.T., Chao, N.S., et al. (2006). Electrical stimulation and biofeedback exercise of pelvic floor muscle for children with faecal incontinence after surgery for anorectal malformation. *Pediatric Surgery International*, 22(12), 975-978.

An EMG biofeedback pelvic-floor muscle program may be a noninvasive alternative for the treatment of patients with Erectile Dysfunction caused by Venous Occlusion.

44. Kampen, M., et al. (2003). Treatment of Erectile Dysfunction by Perineal Exercise, Electromyographic Biofeedback, and Electrical Stimulation. *Physical Therapy*, 83:536-543.

An RCT of 55 men treated with pelvic floor exercises, biofeedback, and suggestions for lifestyle changes versus those treated with lifestyle changes alone revealed those in the treatment group showed significant mean increases in anal pressure and digital anal grades.

After four months, 40% of participants had achieved normal erectile function and 35.5% had improved erectile function - **Erectile Dysfunction**.

45. Dorey, G., Speakman, M., Feneley, R., Swinkels, A., Dunn, C., & Ewings, P. (2004). Randomised controlled trial of pelvic floor muscle exercises and manometric biofeedback for erectile dysfunction. *The British Journal of General Practice: The Journal of the Royal College of General Practitioners*, 54(508), 819-825.
46. Dorey, G., Speakman, M.J., Feneley, R.C., Swinkels, A., & Dunn, C.D. (2005). Pelvic floor exercises for erectile dysfunction. *BJU International*, 96(4), 595-597.

EMG biofeedback may provide pain relief for chronic musculoskeletal pain and may be proposed as an additional intervention to exercise in acute sciatic pain.

47. Angoules, A., et al. (2008). Effectiveness of Electromyographic Biofeedback in the Treatment of Musculoskeletal Pain. *Orthopedics*, (31) 10: 980-984.

EMG biofeedback is an efficacious therapeutic modality following meniscectomy, helping on the quadriceps muscle strength improvement and to accomplish physical activities that require better neuromuscular coordination and control.

48. Kirnap, M. et al. (2005). The efficacy of EMG-biofeedback training on quadriceps muscle strength in patients after arthroscopic meniscectomy. *NZMJ*, 118(1224).
49. Oravitan, M., Avram, C. (2013). The Effectiveness of Electromyographic Biofeedback as Part of a Meniscal Repair Rehabilitation Programme. *Journal of Sports Science and Medicine*, 12: 526-532.
50. Draper V, Ballard L. (1991). Electrical stimulation versus electromyographic biofeedback in the recovery of quadriceps femoris muscle function following anterior cruciate ligament surgery. *Phys Ther*, 71(6):455-461.

The addition of EMG biofeedback to muscle strengthening exercises facilitates the rate of recovery of quadriceps femoris muscle function following Anterior Cruciate Ligament reconstruction; EMG biofeedback is also useful in enhancing knee extension in the early phase of rehabilitation and shown as more effective in facilitating the recovery of quadriceps femoris muscle peak torque than electrical stimulation treatment.

51. Draper V, Ballard L. (1991). Electrical stimulation versus electromyographic biofeedback in the recovery of quadriceps femoris muscle function following anterior cruciate ligament surgery. *Phys Ther*, 71(6):455-461.
52. Christanell, F., et al.(2012). The influence of electromyographic biofeedback therapy on knee extension following anterior cruciate ligament reconstruction: a randomized controlled trial. *Sports Medicine, Arthroscopy, Rehabilitation, Therapy & Technology*, 4:41.
53. Draper, V. (1990). Reconstruction Quadriceps Femoris Muscle Function Following Electromyographic. *PHYS THER*, 70:11-17.

Evidence proven

The incorporation of EMG biofeedback into a physiotherapy exercise program could facilitate the activation of VMO muscle such that the muscle could be preferentially recruited during daily activities and it also might hasten the improvement for subjects with patellofemoral pain in the first few weeks of treatment. It is an efficient and effective treatment approach for **Patellofemoral Pain Syndrome patients**.

54. Ng, G., Zhang, A., Li, C. (2008). Biofeedback exercise improved the EMG activity ratio of the medial and lateral vasti muscles in subjects with patellofemoral pain syndrome. *Journal of Electromyography and Kinesiology*, 18:128-133.
55. Yip, S., Ng, G. (2006). Biofeedback supplementation to physiotherapy exercise programme for rehabilitation of patellofemoral pain syndrome: a randomized controlled pilot study. *Clinical Rehabilitation*, 20:1050-1057.
56. Wise, H., Fiebert, I., Kates, J. (1984). EMG Biofeedback as Treatment for Patellofemoral Pain Syndrome. *The Journal of Orthopaedic and Sports Physical Therapy*, 6(2): 95-103.
57. Angoules, A., et al. (2008). Effectiveness of Electromyographic Biofeedback in the Treatment of Musculoskeletal Pain. *Orthopedics*, (31) 10: 980-984.

EMG biofeedback for Rheumatoid Arthritis reduced duration, intensity, and quality of pain in comparison to control groups in a study performed by Flor et al., and these beneficial effects were maintained two and a half years later.

In another study performed by Lavigne et al., with children, were given relaxation training including EMG biofeedback, and 50 to 62% of the participants showed at least a 25% reduction in pain immediately after treatment, and 62 to 88% showed a 25% reduction by six-month follow up.

58. Flor, H., Haag, G., Turk, D.C., & Koehler, H. (1983). Efficacy of EMG biofeedback, pseudotherapy, and conventional medical treatment for chronic rheumatic back pain. *Pain*, 17(1), 21-31.
59. Flor, H., Haag, G., & Turk, D.C. (1986). Long-term efficacy of EMG biofeedback for chronic rheumatic back pain. *Pain*, 27(2), 195-202.
60. Lavigne, J.V., Ross, C.K., Berry, S.L., & Hayford, J.R. (1992). Evaluation of a psychological treatment package for treating pain in juvenile rheumatoid arthritis. *Arthritis Care & Research*, 5(2), 101-110.

EMG Biofeedback as a treatment modality reduces pain in patients with Fibromyalgia Syndrome.

61. Babu A., Mathew, E., Danda, D., Prakash, H. (2007). Management of patients with fibromyalgia using biofeedback: A randomized control trial. *Indian J Med Sci*, 61:455-61.

EMG biofeedback has been proved to be effective in the improvement of several motor skills in patients with **Cerebral Palsy, including gait speed, regardless of whether gait training is performed on a treadmill or overground, with or without body-weight support; velocity training of the quadriceps muscles; tibialis anterior control and walk using this new gait pattern; triceps surae training for gait symmetry; motor control during standing, sitting or in upper extremity and head control; muscle tone and ankle range of movement**.

62. Moreau, N., et al. (2016). Effectiveness of Rehabilitation Interventions to Improve Gait Speed in Children With Cerebral Palsy: Systematic Review and Meta-analysis. *Physical Therapy*, 96(12): 1938-1954.
63. Colborne G, Wright F, Naumann S. (1994). Feedback of triceps surae EMG in gait of children with cerebral palsy: a controlled study. *Arch Phys Med Rehabil*, 75(1):40.
64. Dursun E, Dursun N, Alican D. (2004). Effects of biofeedback treatment on gait in children with cerebral palsy. *Disabil Rehabil*, 26(2):116-120.
65. Toner, L.V., Cook, K., & Elder, G.C. (1998). Improved ankle function in children with cerebral palsy after computer-assisted motor learning. *Developmental Medicine and Child Neurology*, 40(12), 829-835.
66. Bolek, J.E. (2003). A preliminary study of modification of gait in real time using surface electromyography. *Applied Psychophysiology and Biofeedback*, 28(2), 129-138.
67. Bolek, J.E. (2006). Use of multiple-site performance-contingent SEMG reward programming in pediatric rehabilitation: A retrospective review. *Applied Psychophysiology and Biofeedback*, 31(3), 263-272.
68. Engel, J.M., Jensen, M.P., & Schwartz, L. (2004). Outcome of biofeedback-assisted relaxation for pain in adults with cerebral palsy: Preliminary findings. *Applied Psychophysiology and Biofeedback*, 29(2), 135-140.

EMG biofeedback combined with standard physiotherapy could produce improvements in muscle strength, functional recovery and gait quality compared to standard physiotherapy alone in the **Upper Motor Neuron Syndrome and Spastic Movement Disorder**.

69. Smania, N., et al.(2010). Rehabilitation procedures in the management of spasticity. *European Journal of Physical and Rehabilitation Medicine*, 46: 423-38.

EMG biofeedback is an effective approach for neuromuscular reeducation in the hemiplegic **Stroke patient, including improvements in the ankle dorsiflexion muscle strength, maximising hand, gait and upper extremity function and general muscle force and active range of movement**.

70. Moreland, J., Thomson, M., Fuoco, A.(1998). Electromyographic Biofeedback to Improve Lower Extremity Function After Stroke: A Meta-Analysis. *Arch Phys Med Rehabil*, 79: 134-40.
71. Armagan O, Tascioglu F, Oner C. (2003). Electromyographic biofeedback in the treatment of the hemiplegic hand: a placebo-controlled study. *Am J Phys Med Rehabil*, 82(11):856.
72. Aiello E, et al. (2005) Visual EMG biofeedback to improve ankle function in hemiparetic gait. In *Proceedings of The 27th Annual Conference on Engineering in Medicine and Biology*. Shanghai, China: IEEE.
73. Inglis, J., et al: Electromyographic biofeedback and physical therapy of the hemiplegic upper limb. *Arch Phys Med Rehabil* 1984, 65(12):755.
74. Kim, J. (2017). The effects of training using EMG biofeedback on stroke patients upper extremity functions. *J. Phys. Ther. Sci*. 29: 1085-1088.
75. Schleenbaker, R.E., & Mainous, A.G. (1993). Electromyographic biofeedback for neuromuscular reeducation in the hemiplegic stroke patient: A meta-analysis. *Archives of Physical Medical Rehabilitation*, 74(12), 1301-1304.

EMG Biofeedback is effective for **anxiety reduction in children and adults**.

76. Wenck, L.S., Leu, P.W., & D'Amato, R.C. (1996). Evaluating the efficacy of a biofeedback intervention to reduce children's anxiety. *Journal of Clinical Psychology*, 52(4), 469-473.
77. Roome, J.R., & Romney, D.M. (1985). Reducing anxiety in gifted children by inducing relaxation. *Roeper Review*, 7(3), 177-179.

Dysponesis consists of misplaced and misdirected efforts. EMG monitoring and feedback makes the unaware muscle dysponesis aware and visible, so it's a recommend method for children and adults to prevent illness onset since, prevention is much easier and much more cost effective than treatment.

78. Harvey, E. & Peper, E. (2012). I thought I was relaxed: The use of SEMG biofeedback for training awareness and control. In W. A. Edmonds, & G. Tenenbaum (Eds.), *Case studies in applied psychophysiology: Neurofeedback and biofeedback treatments for advances in human performance*, 144-159.

PHYSIOPLUX KITS

physioplux



PHYSIOPLUX CLINICAL EXPERT

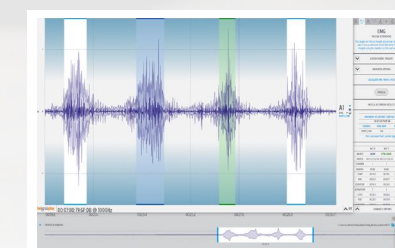
Guide exercise with EMG Biofeedback medical device and research with eight high-quality EMG sensor channels.

Reference PHYEXP	UPC Code 641945959437	PLUX Code 830301003
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8 channels EMG biofeedback medical device prepared with a full range of applications developed to gamify biofeedback exercises for generic, shoulder, knee & pelvic floor injury recovery. The assessment algorithms will allow the physiotherapist to identify muscular imbalances, movement patterns & neuromuscular control levels that will ease the recovery process and allow trainers to design customized exercises to each patient. Visual and sound feedback is available.

It includes optional access to physioplux Care Plus Package (4 EMG's, 200 electrodes, Cloud license) and physioplux Trainer, a feature to prescribe homework exercises for shoulder conditions. physioplux Trainer specificities are available on page X.

Expert comes additionally with access to the OpenSignals software, allowing researchers access to raw data and signal processing algorithms that will help to capture and treat high quality EMG signal for new scientific research.



Hardware

- 1 portable tablet computer with physioplux Clinical software installed
- 1 eight channels wireless physioplux hub
- 8 surface electromyography sensors
- 1 ground cable (reference electrode)
- 25 disposable electrodes
- 2 chargers (tablet and physioplux hub)
- 1 transport box

Software

- physioplux clinical with 11 biofeedback applications pre-installed:
- Biofeedback Generic, Generic Balance, Dynamic Stability Generic, Post-operative Recovery, Dynamic Stability shoulder, Dynamic Stability Patellofemoral, ACL, Pelvic Floor Training Men, Pelvic Floor Training Women, Rapid Contractions and Open Line
- OpenSignals software with EMG analysis add-on included.

Training

- physioplux tutorial videos
- 4 hours in person training

Documentation

- physioplux user manual
- biosignalsplux quick start guide

PHYSIOPLUX CLINICAL PRO

EMG Biofeedback medical device
dedicated to effective knee, shoulder,
pelvic & generic injury recovery training.

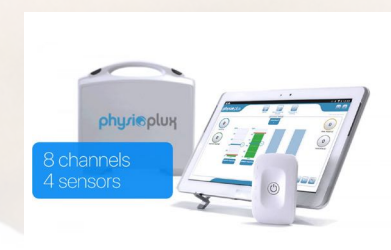
Reference
PHYPRO

UPC Code
641945959420

PLUX Code
830301002

8 channels EMG biofeedback medical device designed for clinical usage, includes a full range of applications for generic, shoulder, knee and pelvic floor conditions. Muscular imbalances, movement patterns & neuromuscular control levels are also available to help on design the specific patient exercise plan. Visual and sound feedback is available.

It includes optional access to physioplux Care Plus Package (4 EMG's, 200 electrodes, Cloud license) and physioplux Trainer, a feature to prescribe homework exercises for shoulder conditions. physioplux Trainer specificities are available on page X.



8 channels
4 sensors



Hardware

- 1 portable tablet computer with physioplux Clinical software installed
- 1 eight channels wireless physioplux hub
- 4 surface electromyography sensors
- 1 ground cable (reference electrode)
- 25 disposable electrodes
- 2 chargers (tablet and physioplux hub)
- 1 transport box

Software

- physioplux clinical with 11 biofeedback applications pre-installed:
- Biofeedback Generic, Generic Balance, Dynamic Stability Generic, Post-operative Recovery, Dynamic Stability shoulder, Dynamic Stability Patellofemoral, ACL, Pelvic Floor Training Men, Pelvic Floor Training Women, Rapid Contractions and Open Line

Training

- physioplux tutorial videos
- 4 hours in person training

Documentation

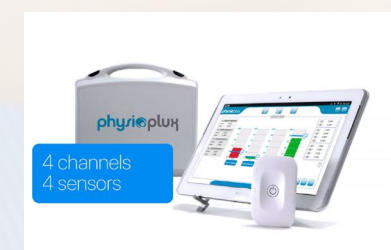
- physioplux user manual
- biosignalsplux quick start guide

PHYSIOPLUX CLINICAL SHOULDER

EMG Biofeedback medical device
dedicated to effective shoulder
conditions recovery training.

Reference	UPC Code	PLUX Code
PHYSHOULDER	641945959413	830301007

4 channels of EMG Biofeedback medical device includes one specific application designed to gamify biofeedback exercise for shoulder conditions. The assessment algorithms allow the therapist to identify movement patterns and imbalances as well as neuromuscular control, allowing to design a customized exercise plan. Visual and sound feedback is available.



Hardware

- 1 portable tablet computer with physioplux Clinical software installed
- 1 four channels wireless physioplux hub
- 4 surface electromyography sensors
- 1 ground cable (reference electrode)
- 25 disposable electrodes
- 2 chargers (tablet and physioplux hub)
- 1 transport box

Software

physioplux Clinical with one specific shoulder application pre-installed.

Training

- Tutorial videos
- In person training packages available (100,00€/hour)
- Remote training packages available (50,00€/hour)

Documentation

- physioplux user manual

PHYSIOPLUX CLINICAL KNEE

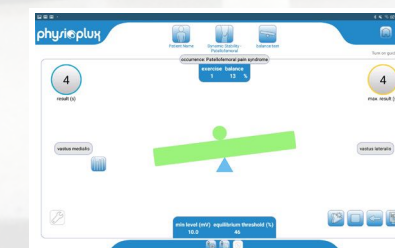
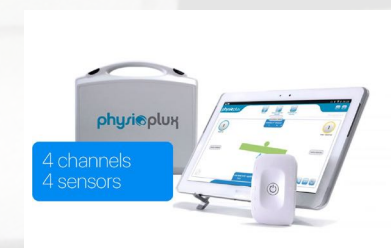
EMG Biofeedback medical device
dedicated to effective knee
injury recovery training.

Reference
PHYKNEE

UPC Code
785614265136

PLUX Code
830301008

4 channels of EMG Biofeedback medical device prepared with two application specially developed to gamify biofeedback exercises for knee injury recovery; the assessment algorithms will allow therapists to identify muscular imbalance ratios that will ease the recovery process and allow trainers to design custom exercises to each patient. Visual and sound feedback is available.



Hardware

- 1 portable tablet computer with physioplux Clinical software installed
- 1 four channels wireless physioplux hub
- 4 surface electromyography sensors
- 1 ground cable (reference electrode)
- 25 disposable electrodes
- 2 chargers (tablet and physioplux hub)
- 1 transport box

Software

- physioplux Clinical with one specific knee application pre-installed.

Training

- Tutorial videos
- In person training packages available (100,00€/hour)
- Remote training packages available (50,00€/hour)

Documentation

- physioplux user manual

PHYSIOPLUX CLINICAL PELVIC

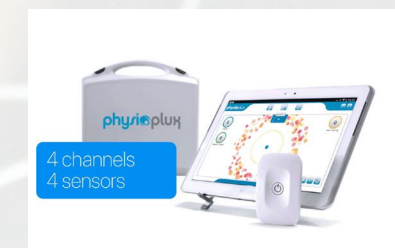
EMG Biofeedback medical device
dedicated to help working
the pelvic floor muscles.

Reference
PHYPELVIC

UPC Code
785614265129

PLUX Code
830301006

4 channels of EMG Biofeedback medical device prepared with four different applications specially developed for pelvic floor muscles biofeedback. It allows to use an EMG or pressure probe, and 3 additional superficial EMG sensors for compensatory muscles activity analysis. Visual and sound feedback is available.



Hardware

- 1 portable tablet computer with physioplux Clinical software installed
- 1 four channels wireless physioplux hub
- 2 surface electromyography sensors
- 1 ground cable (reference electrode)
- 1 vaginal EMG + one pack of 10 EMG disposable probes or 1 reusable pressure probe
- 25 disposable electrodes
- 2 chargers (tablet and physioplux hub)
- 1 transport box

Software

physioplux Clinical with four specific pelvic floor applications pre-installed.

Training

- Tutorial videos
- In person training packages available (100,00€/hour)
- Remote training packages available (50,00€/hour)

Documentation

- physioplux user manual

PHYSIOPLUX TRAINER

PHYSIOPLUX GO

EMG biofeedback for home training, following prescriptions defined by the physiotherapist. Available for expert and pro users.

Simple EMG Biofeedback for generic usage, designed for home training.

Reference PHYTRN	UPC Code 642554232379	PLUX Code 930306004
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Reference PHYTRN	UPC Code 642554232379	PLUX Code 930306004
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2 channels totally wireless EMG Biofeedback device designed for home training. It is a simple, intuitive and totally pre-set application, that receives the specific customized prescription from the physioplux Clinical device. After all the prescribed exercises are concluded, a report is sent to the physiotherapist by e-mail.

2 channels totally wireless EMG Biofeedback device designed for free use home training. A simple 2 bars graphic is available to guide the exercises. Visual and sound feedback is available.

All data is also available on an online dashboard, and prescriptions can be altered remotely. Visual feedback available. Each Trainer can be used by up to 12 different patients per year.

Hardware

- 2 wireless electromyography sensors muscleBANs
- 25 disposable electrodes
- 1 charger (muscleBANs)

Software

- physioplux Trainer (free download on Google Play)
- physioplux Trainer (free download on iTunes)

Documentation

- physioplux Trainer user manual

Hardware

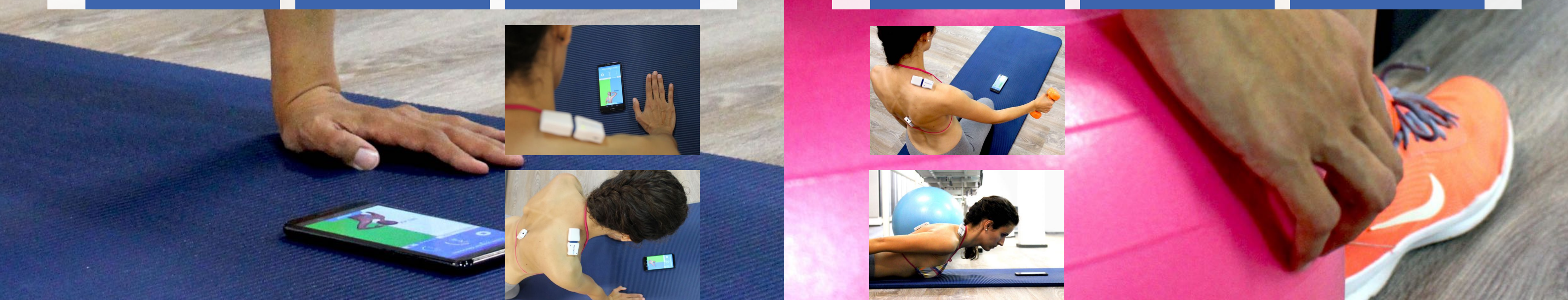
- 2 wireless electromyography sensors muscleBANs
- 25 disposable electrodes
- 1 charger (muscleBANs)

Software

- physioplux Go (free download on Google Play)
- physioplux Go (free download on iTunes)

Documentation

- physioplux Go quick guide



ACCESSORIES



physioplux HUB 8 channels



Wireless, lightweight and portable 8-channel hub with 8 generic analog inputs, for physioplux Clinical.

HUB8CH	641945959635	830301504
Reference	UPC Code	PLUX Code

physioplux HUB 4 channels



Wireless, lightweight and portable 4-channel hub with 8 generic analog inputs, for physioplux Clinical.

HUB4CH	641945959642	830301505
Reference	UPC Code	PLUX Code

Surface EMG sensor



High-performance bipolar sensor with low noise characteristics for seamless muscle data acquisition. Our sensor is especially designed for high performance surface EMG data acquisition even in the most extreme conditions. The bipolar configuration is ideal for uncompromised low-noise data acquisition, and the raw data output provides medical-grade data enabling it to be used for advanced and highly accurate biomedical research.

EMG0001	641945696264	830301202
Reference	UPC Code	PLUX Code

Vaginal EMG



Sensor especially designed for high performance pelvic floor EMG data acquisition, to connect with the EMG Periform/Anuform probes. The bipolar configuration is ideal for uncompromised low-noise data acquisition, and the raw data output provides medical-grade data enabling it to be used for advanced and highly accurate electrophysiology research.

VEP0002	641945959253	830301206
Reference	UPC Code	PLUX Code

Ground cable



Ground cable for EMG signal calibration.

GND0001	641945959451	830301201
Reference	UPC Code	PLUX Code

EMG periform disposable probe



Single user EMG probe.

PEP0001	641945959284	830301205
Reference	UPC Code	PLUX Code

EMG anuform disposable probe



Single user EMG probe.

AEP0001	785614265044	830301509
Reference	UPC Code	PLUX Code

Pressure probe



Multi-users pressure probe.

PP0001	641945959277	830301204
Reference	UPC Code	PLUX Code

Pressure probe tips kit



Pack with 4 silicone tips, with different sizes to adapt to the pressure probe.

VPP0002	641945959260	830301506
Reference	UPC Code	PLUX Code









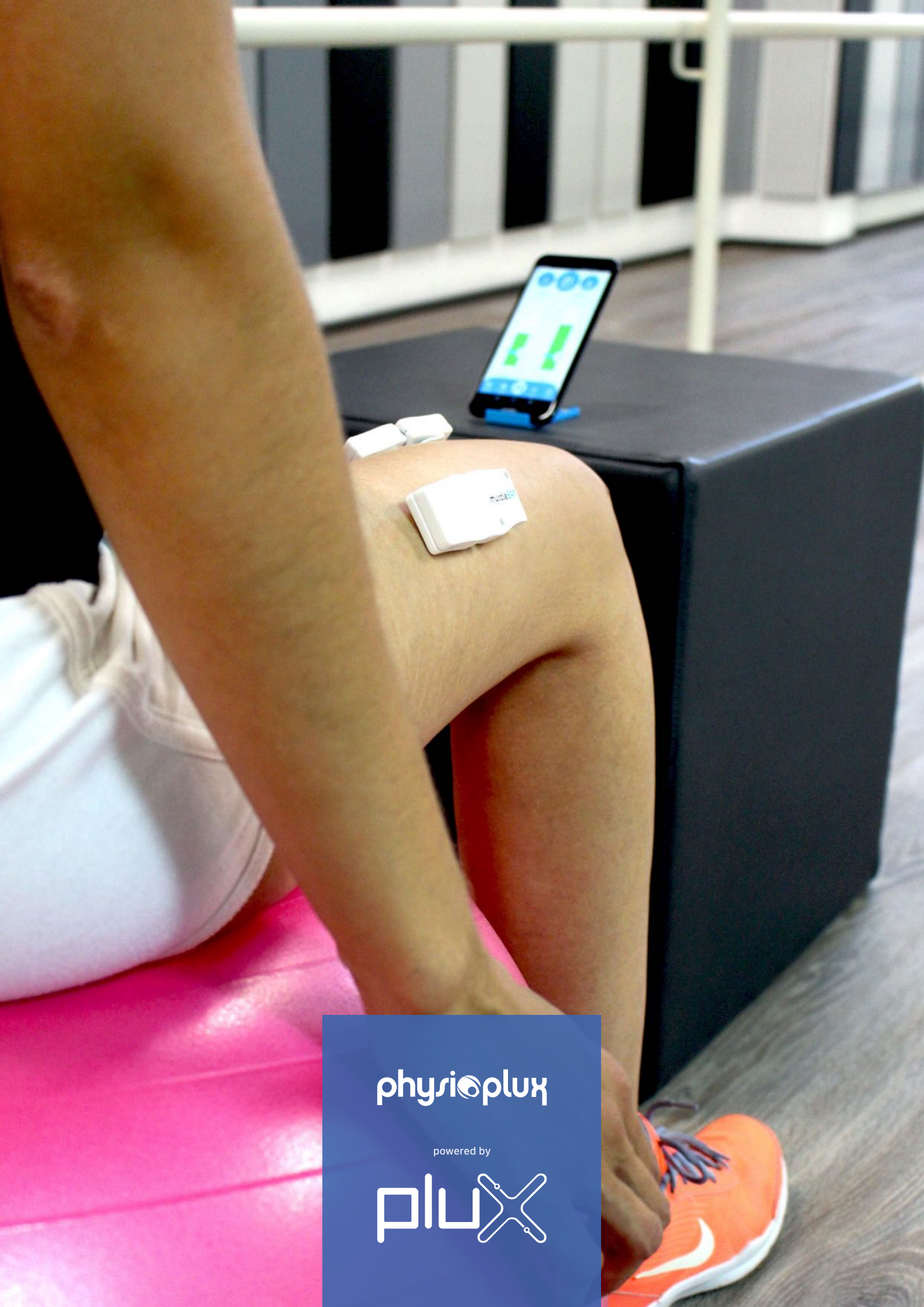
Replacement tablet		Most up to date tablet model with physioplux Clinical software installation included.		
		TAB001 Reference	785614264856 UPC Code	830301201 PLUX Code
Floor stand for tablet		Moveable stand for tablet.		
		ACC0001 Reference	641945959444 UPC Code	830301501 PLUX Code
Table stand for tablet		Moveable stand for tablet.		
		ACC0002 Reference	641945959291 UPC Code	830301501 PLUX Code
Transport box		physioplux transport box, designed to store and organize all components safely.		
		PHYCASE Reference	641945959246 UPC Code	830301503 PLUX Code
Medical grade charger		Medical grade charger for physioplux hub device and for muscleBAN sensors.		
		CMP-HUBCG-1 Reference	641945959246 UPC Code	830301503 PLUX Code

FOTO DO FUNDO PENDENTE

FOTO DO FUNDO PENDENTE

Disposable electrodes		Standard pre-gelled and self-adhesive disposable electrodes with 24mm diameter and 1mm thickness.			
		25 pcs ACCELECTR001 Reference	50 pcs 641945696073 UPC Code	100 pcs 830302103 PLUX Code	200 pcs
Reusable electrodes		Standard pre-gelled and self-adhesive disposable electrodes with 24mm diameter and 1mm thickness.			
		25 pcs ACCRUELEC001 Reference	50 pcs 641945696080 UPC Code	100 pcs 830302107 PLUX Code	200 pcs
Nuprep skin preparation gel		Specialty gel with mild abrasive to clean and reduce the impedance of the skin before applying the electrodes.			
		ACC-GEL-NUPREP Reference	642554232409 UPC Code	820201502 PLUX Code	



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