DOI: 10.1590/1809-2950/18038726022019

CC BY

Surveillance on safety and complications four years after the introduction of Percutaneous Microelectrolisis (MEP®) Sport technique as a physical therapy practice

Vigilância em segurança e complicações quatro anos após a introdução da técnica Microeletrólise Percutânea (MEP®) Sport como prática fisioterapêutica

Nivel de satisfacción sobre la seguridad y complicaciones a cuatro años de la introducción de la técnica Microelectrólisis Percutánea (MEP®) Sport como práctica fisioterapéutica

Santiago Marcelo d'Almeida[1], Rodrigo Marcel Valentim da Silva[2], Oscar Ariel Ronzio[3]

ABSTRACT | This work aims to recollect information about the experience of physical therapists trained in MEP Sport, to know how many treatments they did per week, the adverse effects that might have appeared and the patients and therapists' satisfaction. A mixed multiple choice survey with the option of choosing one or more alternatives to assess the opinion and experience of physical therapists trained in MEP Sport was carried out. SurveyMonkey was used for data collection. The invitations were sent by email to 1.096 physical therapists of Latin America. The survey was answered by 315 professionals, of whom 165 (56,51%) treat 1 to 5 patients per week. The answers about adverse effects were: I've never had adverse effects: 159 answers (56,79%), Hypotensive shock: 55 answers (19,64%), Allergy to metal 15 answers (5,36%). The most common areas/conditions where the MEP is applied are: Patellar tendon (10,77% – 198 answ.), Achilles tendon, (9,58% – 176 answ.), Supraspinatus tendon (9,36% – 172 answ.), Plantar fasciitis/Calcaneal spurs (8,05% – 148 answ.), Trigger points (7,18% – 132 answ.). The professionals' satisfaction was: Satisfied (51,87%, 152 answ.) and Very Satisfied (40,96%, 120 answ.). Patients' satisfaction was: Satisfied (61,90%, 182 answ.) and Very satisfied (29,93%, 88 answ.). MEP is applied mainly in tendinopathies and produces satisfactory and very satisfactory results, both for patients and professionals, with low incidence of adverse effects.

Keywords | Patient Satisfaction; Adverse Effects; Physical Therapy; Electrolysis; Acupuncture.

RESUMO | O objetivo deste trabalho é pesquisar a experiência dos fisioterapeutas formados em microeletrólise percutânea sport e conhecer a quantidade de aplicações realizadas semanalmente, os efeitos adversos apresentados e o nível de satisfação dos terapeutas com seus pacientes. Realizou-se uma enquete de perguntas mistas que avaliam a opinião e a experiência de profissionais certificados em microeletrólise percutânea sport. Os dados foram obtidos por meio da plataforma virtual *SurveyMonkey*, enviando por correio eletrônico um convite a 1.096 fisioterapeutas da América Latina. Responderam o questionário 315 profissionais, dentre os quais 165 (56,51%) atendem de um a cinco pacientes por semana. As respostas sobre efeitos adversos foram: nunca tive complicações (56,79% – 159 respostas); choque hipotensivo (19,64% – 55 respostas.); alergia ao metal (5,36% – 15 respostas). Os locais/patologias a que mais se aplicam a microeletrólise percutânea sport são: tendão rotuliano (10,77% – 198 respostas.); tendão de aquiles (9,58% – 176 respostas.); tendão supraespinhoso (9,36% –x172 respostas.); fascite plantar/esporão calcâneo (8,05% – 148 respostas.);

This work was presented in Oral Free Theme format at the WCPT-SAR congress, Buenos Aires, Argentina, 2016.

[1]Universidad Maimónides (Umai) – Ciudad Autónoma de Buenos Aires, Argentina. Universidad Nacional Arturo Jauretche – F. Varela, Argentina. E-mail: dalmeida.santiago@gmail.com. Orcid: 0000-0003-1854-1756
[2]Centro Universitário Mauricio da Nassau (Uninassau) – Natal (RN), Brasil. E-mail: marcelvalentim@hotmail.com. Orcid: 0000-0002-5859-4599
[3]Universidad Maimónides (Umai) – Ciudad Autónoma de Buenos Aires, Argentina. Universidad Nacional Arturo Jauretche – F. Varela, Argentina. E-mail: ronzio.oscar@maimonides.edu. Orcid: 0000-0002-0004-5992

Corresponding address: Santiago Marcelo d'Almeida – Hidalgo 775 - Ciudad Autónoma de Buenos Aires, Argentina – Zip Code: C1119ACO – Phone: (+054 9 11) 4057 3099 – E-mail: dalmeida.santiago@gmail.com – Finance source: Nothing to declare – Conflict of interests: Nothing to declare – Presentation: Feb. 15th, 2019 – Accepted for publication: Mar. 26th, 2019 – Approved by the Ethics Committee of Maimónides University, resolution KYF08-2015.

e pontos-gatilhos (7,18% – 132 respostas.). A satisfação dos profissionais foi: satisfeito (51,87% – 152 respostas) e muito satisfeito (40,96% – 120 respostas). As respostas dos pacientes foram: satisfeito (61,90% – 182 respostas) e muito satisfeito (29,93% – 88 respostas). A técnica MEP é aplicada principalmente em tendinopatias e produz resultados satisfatórios e muito satisfatórios tanto para os pacientes quanto para os terapeutas, com baixa presença de efeitos adversos.

Descritores | Satisfação do Paciente; Efeitos Adversos; Fisioterapia; Eletrólise; Acupuntura.

RESUMEN | El objetivo de este trabajo es investigar la experiencia de los fisioterapeutas formados en microeletrólisis percutánea sport y conocer la cantidad de aplicaciones realizadas semanalmente, los efectos adversos presentados y el nivel de satisfacción de los terapeutas con sus pacientes. Se realizó una encuesta que evaluó la opinión y la experiencia de profesionales certificados en microelectrolisis percutánea sport. Los datos fueron obtenidos a través de la plataforma virtual *SurveyMonkey*, enviando por correo electrónico una invitación a 1.096 fisioterapeutas de América Latina. Respondieron el cuestionario 315 profesionales, entre los cuales 165 (56,51%) atienden de uno a cinco pacientes por semana. Las respuestas sobre efectos adversos fueron: nunca he tenido complicaciones (56,79% – 59 respuestas); choque hipotensivo (19,64% – 55 respuestas.); alergia al metal (5,36%– 15 respuestas). Los sitios/patologías a que más se aplican la microelectrolisis percutánea sport son: tendón rotuliano (10,77% – 198 respuestas.); tendón de aquiles (9,58% – 176 respuestas); tendón supraespino (9,36% – 172 respuestas.); fascitis plantar/espolón calcáneo (8,05% – 148 respuestas.); y puntos-gatillo (7,18% – 132 respuestas.). La satisfacción de los profesionales fue: satisfecho (51,87% – 152 respuestas) y muy satisfecho (40,96% – 120 respuestas). Las respuestas de los pacientes fueron: satisfecho (61,90% – 182 respuestas) y muy satisfecho (29,93% - 88 respuestas). La técnica MEP se aplica principalmente en tendinopatías y produce resultados satisfactorios y muy satisfactorios tanto para los pacientes como para los terapeutas, con baja presencia de efectos adversos.

Palabras clave | Satisfacción del Paciente; Efectos Adversos; Terapia Física; Electrolisis; Acupuntura.

INTRODUCTION

In the development of a technique, it is necessary to maintain constant control in order to improve the methodology and minimize errors[1]. In clinical work, prejudice should be banished within the scientific methodology and should only be concluded based on the observed findings[2-4]. This allows generating a sequence of work ordered for professionals who wish to apply a technique and at the same time, maximizes patient safety[5].

Although experimental research is the scientific objective, the use of surveys can provide information on the satisfaction of patients or those who apply a technique[5,6].

Within the musculoskeletal pathologies, tendinopathies are hard to resolve. Until not long ago, there was a lack of tools to act on the failure of the cellular inflammatory process, which limits the healing potential of the body[7-12].

In 2008, Percutaneous Microelectrolysis (MEP®) emerges, based on the works of Guirro and Guirro in stretch marks. This technique consists of the percutaneous application (intramuscular and intratendinous) of low intensity cathode galvanic current (in the order of the microamps) and of high current density (approximately 2.5 mA/cm^2)[13]. This generates NaOH that produces a liquefaction of adjacent tissues, triggering an acute controlled inflammatory process. On the other hand, H_2 is released, which inhibits the free radicals present in tendinopathies and muscle injuries[14-16].

The results of clinical studies in tendinopathies have shown that the MEP® technique increases the functional recovery of the patient. Probably the inflammatory process stimulates tendon repair, however, it has not been verified that structural changes occur in it. The increase in inflammation is one of the mechanisms by which eccentric exercises act, one of the most accepted treatment methodologies at the moment. This inflammation would appear to be caused by the shearing movements that occur in the tendon that appear during eccentric work[17]. Significant results of MEP® have also been found in trigger points[18].

The SurveyMonkey platform allows us to develop simple questionnaires, being able to obtain complex statistical data in a short time. This platform allows to personify the style of the survey and to process, currently, up to 16 billion responses per day[19,20].

The Net Promoter® Score (NPS) is an indicator of the speculative index of customer "loyalty". On this scale, the respondent chooses from 0 to 10, being "Detractors" (0-6); "Pasive" (7-8) and "Promoters" (9-10). The NPS can be as low as –100 (all are detractors), up to 100 (all are promoter). An NPS greater than 0 is good and an NPS of 50 is excellent.

The main objective of this study was to determine the adverse effects that have occurred during the application of MEP® after four years of its introduction as a physical therapeutic practice. The secondary objective was to know more about the use of this technique, the satisfaction of the professionals and their perception about the satisfaction of the patients.

METHODOLOGY

This study was approved by the Ethics Committee of Maimónides University, resolution KYF08-2015.

A survey was prepared with mixed questions of multiple options with the possibility of choosing one or more answers. Invitations were sent by email to 1,096 kinesiologists, physical therpists and related professionals from Latin America, trained in the MEP® Sport technique. For this purpose, the virtual platform SurveyMonkey was used to obtain data, by sending an email with an access link to the survey and the response period was between 05/28/2015 and 06/26/2015 was limited. The confidentiality of the data was maintained in accordance with the current *habeas data* regulations.

The inclusion criteria were: (1) Professionals coming from the career of Kinesiology, Physiatry or its equivalent at regional level; (2) Professionals certified in the MEP® Sport technique, in a period of not less than 6 months; (3) Professionals who understand the Spanish language.

The criteria for elimination: (1) not having an updated mail (since they did not receive the invitation to the survey).

For the further processing of the data, Microsoft Excel® 2010 was used.

RESULT

Answers were obtained from 315 participants. The questions asked with their respective results are presented below.

How many patients (pat.) do you attend per week with MEP® Sport?

292 responses were obtained, 23 omissions: 82 participants (28.08%) attend less than 1 patient per week, 165 (56.51%) attend between 1 to 5 per week, 27 (9.25%) attend between 6 and 10 per week, 8 (2.74%) attend between 10 to 15 per week, 5 (1.71%) attend between 15 to 30 patients per week and finally, 5 (1.71%) attend more than 30 patients per week.

Have you ever had complications with MEP® Sport?

256 professionals participated and 59 have omitted the question. Each participant was allowed to choose one or more options and, in case they do not find their answer within the options, they can add it by themselves. A total of 280 responses were obtained, distributed as follows: "I never had complications" 56.79% (159); "Hypotensive *shock*" 19.64% (55); "Allergy to metal" 5.36% (15); "Permanent increase in symptomatology" 3.93% (11); "Skin infection" 3.57% (10); "Needle rupture, should be removed without surgery" 2.50% (7); "Increase of muscular/tendinous fibrosis" 2.14% (6); "Pain" 1.43% (4); "Hematoma/ laceration of vessels" 1.07% (3); "Transitory increase in symptomatology" 1.07% (3); "Belonephobia" 0.71% (2); "Without the expected results" 0.71% (2); "Intratendinous/ intramuscular infection" 0.36% (1); "Needle rupture, must be removed by surgical means" 0.36% (1); "Abandonment of the patient" 0.36% (1). The options "Intraarticular infection" and "Tendon rupture" obtained 0 responses.

Figure 1 shows complications classified as mild; significant and serious, according to the division proposed by Garrido[21].

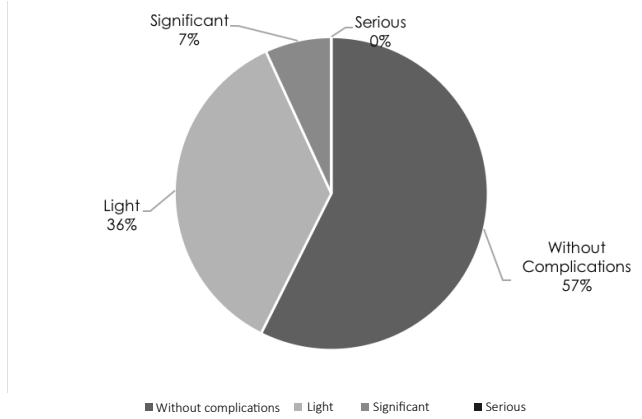

Figure 1. Complications with MEP® Sport

In what areas/conditions does MEP® apply regularly in your practice?

In this question 293 participants answered, and 22 omitted. With the same methodology as the previous question, each participant is allowed to choose one or more answers, and if their answer is not found within the given options, they can add it by themselves.

A total of 1838 answers is obtained, detailing below: "Patellar T." 10.77% (198); "Achilles T." 9.58% (176); "Supraspinatus T.", 9.36% (172); "Plantar Fasciitis/ Calcaneal Spur" 8.05% (148); "Trigger points" 7.18% (132); "Epicondylitis" 7.02% (129); "Pubalgia" 5.82% (107); "Chronic muscle injuries" 5.22% (96); "Entorsis/ Sprains" 5.01% (92); "Bicipital T." 4.90% (90); "Goosefoot" 4.13% (76); "Patellofemoral" 3.32% (61); "Subacute muscle injuries" 3.21% (59); "Acute muscle injuries" 3.05% (56); "Epitrochlearis" 2.99% (55); "Ischialgia" 2.23% (41); "Quervain" 2.01% (37); "Iliotibial band" 1.85% (34); "Stria" 1.52% (28); "Hand" 1.25% (23); "Wrinkles" 1.03% (19); "Tendinopathies" 0.16% (3); "Trochanteric bursitis" 0.11% (2); "Post Qx Scars" 0.11% (2); "Trigger finger" 0.05% (1); "Post Qx Hallux Valgus" 0.05% (1). Figure 2 shows the data obtained.

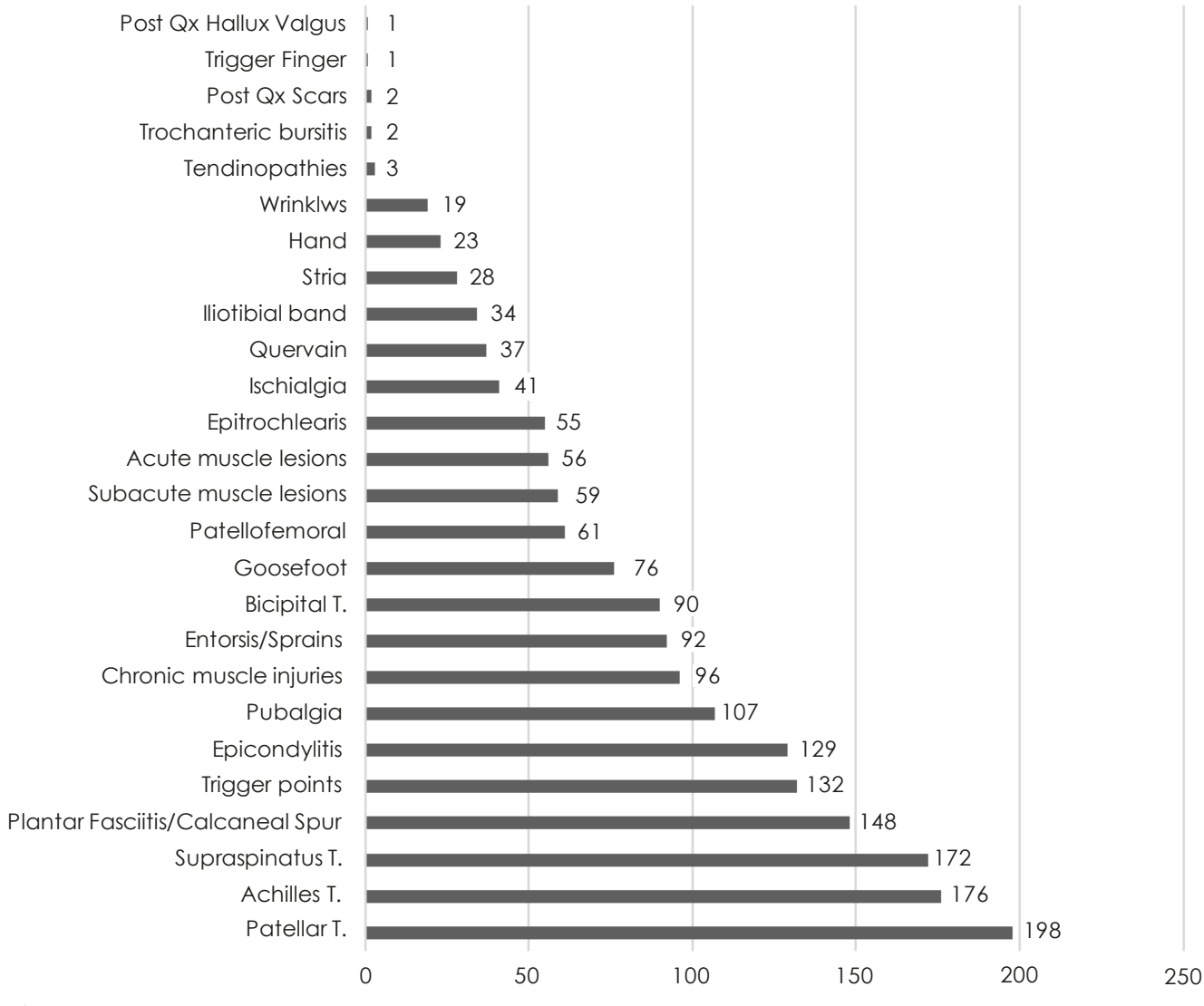

Figure 2. MEP® Sport application areas

How satisfied are you with the results obtained with MEP®?

In the next question, 293 professionals and a total of 22 participants ignored the answer. A question with multiple options is presented closed with a single selection and the results are the following: "Unsatisfied": 0% (0); "Little satisfied": 1.71% (5); "Neutral": 5.46% (16); "Satisfied": 51.87% (152) and "Very satisfied": 40.96% (120).

Figure 3 shows the nominal representation of the results obtained.

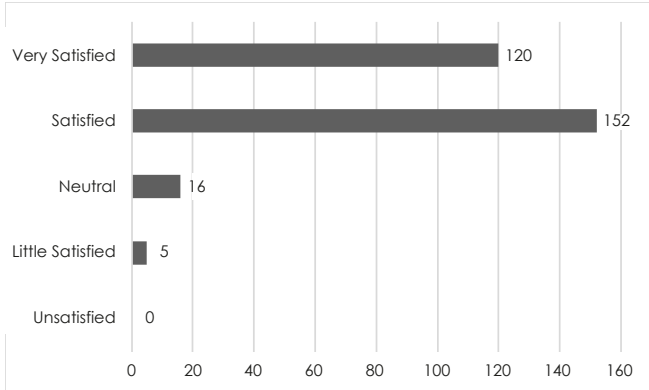

Figure 3. MEP® Sport satisfaction

How satisfied were patients in general with the results obtained by MEP®?

In this case, the same methodology is applied, but from the perception of what has been the degree of satisfaction of the patients, according to the professional. A total of 294 participants and 21 decide to omit the question. The final results are the following: "Unsatisfied": 0% (0); "Little satisfied": 1.36% (4); "Neutral": 6.80% (20); "Satisfied": 61.90% (182) and "Very satisfied": 29.93% (88).

How likely is it that you recommend MEP® certification to a friend or colleague?

As a final question, the Net Promoter® Score is obtained. 309 professionals responded and 6 omitted their response. The results were: "Detractors": 9% (29); "Pasive": 29% (90); "Promoters": 61% (190).

DISCUSSION

Despite the large number of existant therapies, there are few who assess satisfaction in its application. This study sought to evaluate not only the satisfaction of the therapist but also the perception of the professional about the satisfaction of their patients to the MEP® technique. On the other hand, a data survey was carried out on the pathologies that the technique is being used and what are the existing complications.

Regarding the results, the groups that should be focused on are those that use the technique with at least 1 and up to 5 patients per week. These subgroups make up 84.59% of the professionals (247 participants).

The application of the MEP® technique is similar to that of dry needling (DN), since both use acupuncture needles. This technique is considered safe according to the study of Gonzalez-Perez et al.[6], meta-analysis and review of Liu et al.[3], or the review by Dunning et al.[22]. Therefore, it is not surprising that 56.79% (159) of the participants had no complications and that only one case (0.36%) of significant complication was reported (Needle rupture, which must be removed by surgery) and none severe [21,23-25].

Of course that adverse effects are inherent to any minimally invasive therapy and so this study is in accordance with Cotchett et al.[26], in which bruises and increase post application pain of DN are temporarily present. Even Brady and McEvoy[27] research project, where they detail the consequences of the application of DN in 7629 cases, they show that bleeding (7.55%), bruises (4.35%), pain after application (2.69%) and dizziness (0.26%) are simple complications of possible onset[28].

In the injury section, tendon injuries predominate with 72.03%, where the highest percentage is located in LL, mainly in Patellar T.. This is consistent with the epidemiological studies carried out by Barber Foss et al.[29] and Oller et al.[30].

It is recommended in future studies, to collect information on the conditions that intratendon and cutaneous infections cases have occurred. Studies of Gomes et al.[31] and Rabinovitch and Stewart[32] show the bactericidal effects of currents with a galvanic component.

CONCLUSION

From the findings, it is possible to conclude that the MEP® technique is used mainly in the treatment of tendinopathies; most patients did not have complications, and the low prevalence of significant complications stands out (0.36%). Finally, the response to the MEP® technique was mostly satisfactory and very satisfactory for patients and therapists.

REFERENCES

1. Furlan AD, van Tulder MW, Cherkin D, Tsukayama H, Lao L, Koes BW, et al. Acupuncture and dry-needling for low back pain. Cochrane Database Syst Rev. 2005;(1):1-10. doi: 10.1002/14651858.CD001351.pub2
2. Morihisa R, Eskew J, McNamara A, Young J. Dry needling in subjects with muscular trigger points in the lower quarter: a systematic review. Int J Sports Phys Ther. 2016;11(1):1-14.

3. Liu L, Huang QM, Liu QG, Ye G, Bo CZ, Chen MJ, et al. Effectiveness of dry needling for myofascial trigger points associated with neck and shoulder pain: a systematic review and meta-analysis. Arch Phys Med Rehabil. 2015;96(5):944-55. doi: 10.1016/j.apmr.2014.12.015
4. Aqil A, Siddiqui MRS, Solan M, Redfern DJ, Gulati V, Cobb JP. Extracorporeal shock wave therapy is effective in treating chronic plantar fasciitis: a meta-analysis of RCTs. Clin Orthop Relat Res. 2013;471(11):3645-52. doi: 10.1007/s11999-013-3132-2
5. Chung E, Cartmill R. Evaluation of clinical efficacy, safety and patient satisfaction rate after low-intensity extracorporeal shockwave therapy for the treatment of male erectile dysfunction: an Australian first open-label single-arm prospective clinical trial. BJU Int. 2015;115(S5):46-9. doi: 10.1111/bju.13035
6. Gonzalez-Perez LM, Infante-Cossio P, Granados-Nunez M, Urresti-Lopez FJ, Lopez-Martos R, Ruiz-Canela-Mendez P. Deep dry needling of trigger points located in the lateral pterygoid muscle: efficacy and safety of treatment for management of myofascial pain and temporomandibular dysfunction. Med Oral Patol Oral Cir Bucal. 2015;20(3):e326-33. doi: 10.4317/medoral.20384
7. Michener LA, Kulig K. Not all tendons are created equal: implications for differing treatment approaches. J Orthop Sports Phys Ther. 2015;45(11):829-32. doi: 10.2519/jospt.2015.0114
8. Cook JL, Purdam CR. Is tendon pathology a continuum? A pathology model to explain the clinical presentation of load-induced tendinopathy. Br J Sports Med. 2009;43(6):409-16. doi: 10.1136/bjsm.2008.051193
9. Magra M, Maffulli N. Genetic aspects of tendinopathy. J Sci Med Sport. 2008;11(3):243-7. doi: 10.1016/j.jsams.2007.04.007
10. Coleman BD, Khan KM, Maffulli N, Cook JL, Wark JD. Studies of surgical outcome after patellar tendinopathy: clinical significance of methodological deficiencies and guidelines for future studies. Scand J Med Sci Sports. 2000;10(1):2-11. doi: 10.1034/j.1600-0838.2000.010001002.x
11. Jarvinen M, Jozsa L, Kannus P, Jarvinen TLN, Kvist M, Leadbetter W. Histopathological findings in chronic tendon disorders. Scand J Med Sci Sports. 2007;7(2):86-95. doi: 10.1111/j.1600-0838.1997.tb00124.x
12. Riley G. The pathogenesis of tendinopathy: a molecular perspective. Rheumatology. 2004;43(2):131-42. doi: 10.1093/rheumatology/keg448
13. Oliveira Guirro EC. Fisioterapia dermato-funcional: fundamentos-recursos-patologias. Barueri: Manole; 2002.
14. D'Addona A, Maffulli N, Formisano S, Rosa D. Inflammation in tendinopathy. Surgeon. 2017;15(5):297-302. doi: 10.1016/j.surge.2017.04.004
15. Ostojic SM, Vukomanovic B, Calleja-Gonzalez J, Hoffman JR. Effectiveness of oral and topical hydrogen for sports-related soft tissue injuries. Postgrad Med. 2014;126(5):188-96. doi: 10.3810/pgm.2014.09.2813
16. Silva RMV, Costa LS, Coldibeli ES, Fernandes MRS, Meyer PF, Ronzio OA. Effects of microelectrólisis percutaneous® on pain and functionality in patients with calcaneal tendinopathy. MTP & Rehab Journal. 2014;12(84):185-90. doi: 10.17784/mtprehabjournal.2014.12.188
17. Couppe C, Svensson RB, Silbernagel KG, Langberg H, Magnusson SP. Eccentric or concentric exercises for the treatment of tendinopathies? J Orthop Sport Phys Ther. 2015;45(11):853-63. doi: 10.2519/jospt.2015.5910
18. Ronzio OA, Villa CA, Gomez D, Silva RMV, Gill JP, d'Almeida S, et al. Effects in pressure-pain threshold of percutaneous galvanic microcurrent in the trapezius trigger points. Physiotherapy. 2015;101(2011):e1297-8. doi: 10.1002/chem.201603559
19. Waclawski E. How i use it: survey monkey. Occup Med (Chic Ill). 2012;62(6):477. doi: 10.1093/occmed/kqs075
20. Wilson LJ, Yepuri JN, Moses RE. The advantages and challenges of measuring patient experience in outpatient clinical practice. Part 3: patient satisfaction and your practice. Am J Gastroenterol. 2016;111(6):757-9. doi: 10.1038/ajg.2016.79
21. Garrido FV, Muñoz FM. Fisioterapia invasiva. Barcelona: Elsevier España; 2013.
22. Dunning J, Butts R, Mourad F, Young I, Flannagan S, Perreault T. Dry needling: a literature review with implications for clinical practice guidelines. Phys Ther Rev. 2014;19(4):252-65. doi: 10.1179/108331913X13844245102034
23. MacPherson H, Thomas K, Walters S, Fitter M. The York acupuncture safety study: prospective survey of 34 000 treatments by traditional acupuncturists. BMJ. 2001;323(7311):486-7. doi: 10.1136/bmj.323.7311.486
24. White A, Hayhoe S, Hart A, Ernst E. Adverse events following acupuncture: prospective survey of 32.000 consultations with doctors and physiotherapists. BMJ. 2001;323(7311):485-6. doi: 10.1136/bmj.323.7311.485
25. Witt CM, Pach D, Brinkhaus B, Wruck K, Tag B, Mank S, et al. Safety of acupuncture: results of a prospective observational study with 229,230 patients and introduction of a medical information and consent form. Forsch Komplementmed. 2009;16(2):91-7. doi: 10.1159/000209315
26. Cotchett MP, Munteanu SE, Landorf KB. Effectiveness of trigger point dry needling for plantar heel pain: a randomized controlled trial. Phys Ther. 2007;87(8):1083-94. doi: 10.2522/ptj.20060295
27. Brady S, McEvoy J, Dommerholt J, Doody C. Adverse events following trigger point dry needling: a prospective survey of chartered physiotherapists. J Man Manip Ther. 2014;22(3):134-40. doi: 10.1179/2042618613Y.0000000044
28. Roerdink RL, Dietvorst M, Zwaard BVD, van der Worp H, Zwerver J. Complications of extracorporeal shockwave therapy in plantar fasciitis: systematic review. Int J Surg. 2017;46:133-45. doi: 10.1016/j.ijsu.2017.08.587
29. Barber Foss KD, Myer GD, Hewett TE. Epidemiology of basketball, soccer, and volleyball injuries in middle-school female athletes. Phys Sportsmed. 2014;42(2):146-53. doi: 10.3810/psm.2014.05.2066
30. Oller DM, Buckley WE, Sebastianelli WJ, Vairo GL. Injury and illness epidemiology at a summer sport-camp program, 2008 through 2011. J Athl Train. 2015;50(3):313-20. doi: 10.4085/1062-6050-49.3.93
31. Gomes RC, Brandino HE, Sousa NT, Santos MF, Martinez R, Guirro RRJ. Polarized currents inhibit in vitro growth of bacteria colonizing cutaneous ulcers. Wound Repair Regen. 2015;23(3):403-11. doi: 10.1111/wrr.12296
32. Rabinovitch C, Stewart PS. Removal and inactivation of Staphylococcus epidermidis biofilms by electrolysis. Appl Environ Microbiol. 2006;72(9):6364-6. doi: 10.1128/AEM.00442-06