

# World Journal of *Gastroenterology*

*World J Gastroenterol* 2017 May 28; 23(20): 3569-3760



**EDITORIAL**

- 3569 Hepatitis C in injection drug users: It is time to treat  
*Grassi A, Ballardini G*
- 3572 Cyclooxygenase 2 in liver dysfunction and carcinogenesis: Facts and perspectives  
*Martín-Sanz P, Casado M, Boscá L*

**REVIEW**

- 3581 First quarter century of laparoscopic liver resection  
*Morise Z, Wakabayashi G*
- 3589 Hepatitis A virus infection and hepatitis A vaccination in human immunodeficiency virus-positive patients: A review  
*Lin KY, Chen GJ, Lee YL, Huang YC, Cheng A, Sun HY, Chang SY, Liu CE, Hung CC*
- 3607 Brain changes detected by functional magnetic resonance imaging and spectroscopy in patients with Crohn's disease  
*Lv K, Fan YH, Xu L, Xu MS*
- 3615 Perspectives of traditional Chinese medicine in pancreas protection for acute pancreatitis  
*Li J, Zhang S, Zhou R, Zhang J, Li ZF*

**MINIREVIEWS**

- 3624 Transition of pediatric to adult care in inflammatory bowel disease: Is it as easy as 1, 2, 3?  
*Afzali A, Wahbeh G*
- 3632 Colorectal cancer population screening programs worldwide in 2016: An update  
*Navarro M, Nicolas A, Ferrandez A, Lanás A*

**ORIGINAL ARTICLE****Basic Study**

- 3643 Urinary metabolic insights into host-gut microbial interactions in healthy and IBD children  
*Martin FP, Su MM, Xie GX, Guiraud SP, Kussmann M, Godin JP, Jia W, Nydegger A*
- 3655 M2-like Kupffer cells in fibrotic liver may protect against acute insult  
*Zheng QF, Bai L, Duan ZP, Han YP, Zheng SJ, Chen Y, Li JS*

- 3664 Sonographic appearance of anal cushions of hemorrhoids

*Aimaiti A, A Ba Bai Ke Re MMTJ, Ibrahim I, Chen H, Tuerdi M, Mayinuer*

- 3675 Effect of NDC80 in human hepatocellular carcinoma

*Ju LL, Chen L, Li JH, Wang YF, Lu RJ, Bian ZL, Shao JG*

- 3684 Animal experimental studies using small intestine endoscope

*Liu JH, Liu DY, Wang L, Han LP, Qi ZY, Ren HJ, Feng Y, Luan FM, Mi LT, Shan SM*

#### Retrospective Cohort Study

- 3690 Radiological response and inflammation scores predict tumour recurrence in patients treated with transarterial chemoembolization before liver transplantation

*Nicolini D, Agostini A, Montalti R, Mocchegiani F, Mincarelli C, Mandolesi A, Robertson NL, Candelari R, Giovagnoni A, Vivarelli M*

#### Retrospective Study

- 3702 Surgical management of liver diseases invading the hepatocaval confluence based on IH classification: The surgical guideline in our center

*Li W, Han J, Wu ZP, Wu H*

#### Observational Study

- 3713 Study on the value of serum miR-106b for the early diagnosis of hepatocellular carcinoma

*Shi BM, Lu W, Ji K, Wang YF, Xiao S, Wang XY*

#### Prospective Study

- 3721 Clinical significance of expression of proliferating cell nuclear antigen and E-cadherin in gastric carcinoma

*Hu L, Li HL, Li WF, Chen JM, Yang JT, Gu JJ, Xin L*

#### META-ANALYSIS

- 3730 Different techniques for harvesting grafts for living donor liver transplantation: A systematic review and meta-analysis

*Li H, Zhang JB, Chen XL, Fan L, Wang L, Li SH, Zheng QL, Wang XM, Yang Y, Chen GH, Wang GS*

#### CASE REPORT

- 3744 Successful treatment of a pancreatic schwannoma by spleen-preserving distal pancreatectomy

*Xu SY, Wu YS, Li JH, Sun K, Hu ZH, Zheng SS, Wang WL*

- 3752 Preoperative detection and localization of small bowel hemangioma: Two case reports

*Takase N, Fukui K, Tani T, Nishimura T, Tanaka T, Harada N, Ueno K, Takamatsu M, Nishizawa A, Okamura A, Kaneda K*

**LETTERS TO THE EDITOR**

- 3758** Non-invasive stimulation techniques to relieve abdominal/pelvic pain: Is more always better?

*Harvey MP, Watier A, Dufort Rouleau É, Léonard G*

**ABOUT COVER**

Editorial board member of *World Journal of Gastroenterology*, Jia Liu, MD, Associate Professor, Department of Infectious Diseases, Institution of Infection and Immunology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan 430022, Hubei Province, China

**AIMS AND SCOPE**

*World Journal of Gastroenterology* (*World J Gastroenterol*, *WJG*, print ISSN 1007-9327, online ISSN 2219-2840, DOI: 10.3748) is a peer-reviewed open access journal. *WJG* was established on October 1, 1995. It is published weekly on the 7<sup>th</sup>, 14<sup>th</sup>, 21<sup>st</sup>, and 28<sup>th</sup> each month. The *WJG* Editorial Board consists of 1375 experts in gastroenterology and hepatology from 68 countries.

The primary task of *WJG* is to rapidly publish high-quality original articles, reviews, and commentaries in the fields of gastroenterology, hepatology, gastrointestinal endoscopy, gastrointestinal surgery, hepatobiliary surgery, gastrointestinal oncology, gastrointestinal radiation oncology, gastrointestinal imaging, gastrointestinal interventional therapy, gastrointestinal infectious diseases, gastrointestinal pharmacology, gastrointestinal pathophysiology, gastrointestinal pathology, evidence-based medicine in gastroenterology, pancreatology, gastrointestinal laboratory medicine, gastrointestinal molecular biology, gastrointestinal immunology, gastrointestinal microbiology, gastrointestinal genetics, gastrointestinal translational medicine, gastrointestinal diagnostics, and gastrointestinal therapeutics. *WJG* is dedicated to become an influential and prestigious journal in gastroenterology and hepatology, to promote the development of above disciplines, and to improve the diagnostic and therapeutic skill and expertise of clinicians.

**INDEXING/ABSTRACTING**

*World Journal of Gastroenterology* (*WJG*) is now indexed in Current Contents<sup>®</sup>/Clinical Medicine, Science Citation Index Expanded (also known as SciSearch<sup>®</sup>), Journal Citation Reports<sup>®</sup>, Index Medicus, MEDLINE, PubMed, PubMed Central, Digital Object Identifier, and Directory of Open Access Journals. The 2015 edition of Journal Citation Reports<sup>®</sup> released by Thomson Reuters (ISI) cites the 2015 impact factor for *WJG* as 2.787 (5-year impact factor: 2.848), ranking *WJG* as 38 among 78 journals in gastroenterology and hepatology (quartile in category Q2).

**FLYLEAF**

**I-IX Editorial Board**

**EDITORS FOR THIS ISSUE**

**Responsible Assistant Editor:** Xiang Li  
**Responsible Electronic Editor:** Cai-Hong Wang  
**Proofing Editor-in-Chief:** Lian-Sheng Ma

**Responsible Science Editor:** Yuan Qi  
**Proofing Editorial Office Director:** Jin-Lei Wang

**NAME OF JOURNAL**  
*World Journal of Gastroenterology*

**ISSN**  
ISSN 1007-9327 (print)  
ISSN 2219-2840 (online)

**LAUNCH DATE**  
October 1, 1995

**FREQUENCY**  
Weekly

**EDITORS-IN-CHIEF**  
**Damian Garcia-Olmo, MD, PhD, Doctor, Professor, Surgeon**, Department of Surgery, Universidad Autonoma de Madrid; Department of General Surgery, Fundacion Jimenez Diaz University Hospital, Madrid 28040, Spain

**Stephen C Strom, PhD, Professor**, Department of Laboratory Medicine, Division of Pathology, Karolinska Institutet, Stockholm 141-86, Sweden

**Andrzej S Tarnawski, MD, PhD, DSc (Med), Professor of Medicine, Chief Gastroenterology**, VA Long Beach Health Care System, University of California, Irvine, CA, 5901 E. Seventh Str., Long Beach,

CA 90822, United States

**EDITORIAL BOARD MEMBERS**  
All editorial board members resources online at <http://www.wjgnet.com/1007-9327/editorialboard.htm>

**EDITORIAL OFFICE**  
Jin-Lei Wang, Director  
Yuan Qi, Vice Director  
Ze-Mao Gong, Vice Director  
*World Journal of Gastroenterology*  
Baishideng Publishing Group Inc  
7901 Stoneridge Drive, Suite 501,  
Pleasanton, CA 94588, USA  
Telephone: +1-925-2238242  
Fax: +1-925-2238243  
E-mail: [editorialoffice@wjgnet.com](mailto:editorialoffice@wjgnet.com)  
Help Desk: <http://www.f6publishing.com/helpdesk>  
<http://www.wjgnet.com>

**PUBLISHER**  
Baishideng Publishing Group Inc  
7901 Stoneridge Drive, Suite 501,  
Pleasanton, CA 94588, USA  
Telephone: +1-925-2238242  
Fax: +1-925-2238243  
E-mail: [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)  
Help Desk: <http://www.f6publishing.com/helpdesk>

<http://www.wjgnet.com>

**PUBLICATION DATE**  
May 28, 2017

**COPYRIGHT**  
© 2017 Baishideng Publishing Group Inc. Articles published by this Open-Access journal are distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits use, distribution, and reproduction in any medium, provided the original work is properly cited, the use is non commercial and is otherwise in compliance with the license.

**SPECIAL STATEMENT**  
All articles published in journals owned by the Baishideng Publishing Group (BPG) represent the views and opinions of their authors, and not the views, opinions or policies of the BPG, except where otherwise explicitly indicated.

**INSTRUCTIONS TO AUTHORS**  
Full instructions are available online at <http://www.wjgnet.com/bpg/gerinfo/204>

**ONLINE SUBMISSION**  
<http://www.f6publishing.com>



## Non-invasive stimulation techniques to relieve abdominal/pelvic pain: Is more always better?

Marie-Philippe Harvey, Alain Watier, Émilie Dufort Rouleau, Guillaume Léonard

Marie-Philippe Harvey, Guillaume Léonard, Research Centre on Aging, Université de Sherbrooke, Québec J1H 4C4, Canada

Alain Watier, Department of Gastroenterology, Sherbrooke University Hospital Centre, Sherbrooke, Québec J1G 2E8, Canada

Émilie Dufort Rouleau, Department of Pharmacy, Sherbrooke University Hospital Centre, Sherbrooke, Québec J1G 2E8, Canada

Guillaume Léonard, School of Rehabilitation, University of Sherbrooke, Québec J1H 5N4, Canada

**Author contributions:** Harvey MP, Watier A, Dufort Rouleau É and Léonard G contributed equally to this work; Watier A and Léonard G designed the research; Harvey MP and Dufort Rouleau É performed the research; Harvey MP and Léonard G analyzed the data; Harvey MP, Watier A, Dufort Rouleau É and Léonard G wrote the paper.

**Supported by the Fonds de recherche en santé du Québec (FRQS), No. 29182.**

**Conflict-of-interest statement:** Léonard G has received research funding from Fonds de recherche en santé du Québec; Watier A and Dufort Rouleau É are employees of the Sherbrooke University Hospital Centre; Watier A and Léonard G are employees of the University of Sherbrooke.

**Open-Access:** This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

**Manuscript source:** Unsolicited manuscript

**Correspondence to:** Guillaume Léonard, PT, PhD, Researcher, Research Centre on Aging, Université de Sherbrooke, 1036 rue Belvédère Sud, Québec J1H 4C4,

Canada. [guillaume.leonard2@usherbrooke.ca](mailto:guillaume.leonard2@usherbrooke.ca)

Telephone: +1-819-780-2220

Fax: +1-819-820-6864

Received: November 17, 2016

Peer-review started: November 21, 2016

First decision: February 10, 2017

Revised: March 10, 2017

Accepted: April 12, 2017

Article in press: April 12, 2017

Published online: May 28, 2017

### Abstract

Chronic abdominal and pelvic pain is a common condition that has significant impact on quality of life, and causes billions of dollars in direct and indirect costs. Emerging data suggest that transcranial direct current stimulation (tDCS), alone or in combination with transcutaneous electrical nerve stimulation (TENS), could be a promising therapeutic avenue to reduce chronic pain. The encouraging results coming from these studies prompted us to try combining TENS and tDCS in 4 of our patients who suffered from chronic abdominal/pelvic pain and to compare the effect with 5 other patients who received TENS alone. Pain intensity was assessed with a visual analog scale before, during and after the stimulation. We observed that there was a slight decrease in pain which was similar in both patient groups (TENS alone and TENS combined with tDCS). These observations suggest that combining TENS and tDCS in patients suffering from chronic pelvic and/or abdominal pain produces no additional benefit, compared to TENS alone. Future studies, looking at the effect of several/consecutive TENS and tDCS sessions should be conducted.

**Key words:** Transcranial direct current stimulation; Transcutaneous electrical nerve stimulation; Pelvic pain; Abdominal pain; Chronic pain



© The Author(s) 2017. Published by Baishideng Publishing Group Inc. All rights reserved.

**Core tip:** Past studies have showed that combining transcutaneous electrical nerve stimulation (TENS) and transcranial direct current stimulation (tDCS) can be an effective strategy to relieve chronic pain. In this letter, we describe the observations made on nine patients suffering from chronic pelvic and/or abdominal pain. Combining TENS and tDCS produced negligible effect on pain. The reduction in pain noted after the application of TENS and tDCS was comparable to the reduction noted after the application of TENS only. These clinical observations question the added value of tDCS in patients suffering from chronic pelvic and abdominal pain.

Harvey MP, Watier A, Dufort Rouleau É, Léonard G. Non-invasive stimulation techniques to relieve abdominal/pelvic pain: Is more always better? *World J Gastroenterol* 2017; 23(20): 3758-3760 Available from: URL: <http://www.wjgnet.com/1007-9327/full/v23/i20/3758.htm> DOI: <http://dx.doi.org/10.3748/wjg.v23.i20.3758>

## TO THE EDITOR

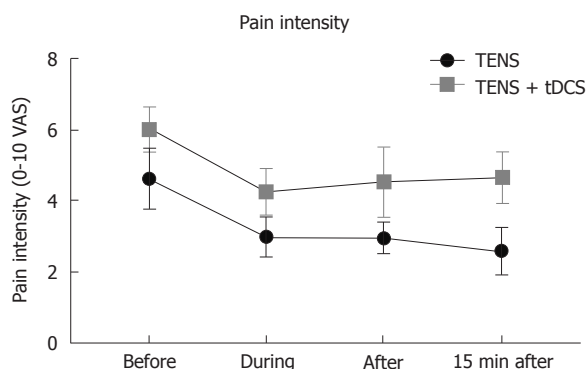
Chronic pelvic pain syndrome is quite prevalent and disabling, and should definitely receive more attention<sup>[1]</sup>. Abnormalities in the brain-gut axis play an important role in functional gastro-intestinal disorders, suggesting that brain modulation can be a part of the solution to relieve visceral pain, such as pelvic and abdominal pain<sup>[2]</sup>. Over the last few years, two studies looking into the usefulness of brain stimulation techniques to reduce chronic abdominal and pelvic pain syndromes were published. The first article, published by Fenton *et al.*<sup>[3]</sup>, looked into the safety and efficacy of transcranial direct current stimulation (tDCS) in patients suffering from refractory chronic pelvic pain. Then, a few years later, Schabrun *et al.*<sup>[4]</sup> published a study in which they suggested that combining tDCS to transcutaneous electrical nerve stimulation (TENS) could be more effective to reduce pain than tDCS or TENS alone. TENS is a modality that is frequently used with our patients. Although the outcomes are generally good, some patients report no significant benefit following TENS application. The results reported by Schabrun *et al.*<sup>[4]</sup> prompted us to try combining TENS and tDCS in our patients who suffered from chronic abdominal and/or pelvic pain and who failed standard pharmacological/surgical therapies.

Patients were randomly allocated to TENS alone ( $n = 5$ ) or TENS combined with tDCS ( $n = 4$ ) using a random numbers table with a ratio of 1: 1, based on their order of entry in the trial. All patients (mean age  $43 \pm 10$  years old) were medicated for their pain (8 with opioids, 5 with cannabinoids, 5 with

anticonvulsants, and 1 with tricyclic antidepressants; note that every patient had at least two medications). They were asked to keep their medication stable at least 1 mo before receiving the neurostimulation treatments. There was no difference between the 2 treatment groups regarding the age and medical diagnosis, although the proportion of women tended to be higher in the TENS-only group. For both groups, TENS was delivered using 2 pairs of rubber silicone electrodes connected to a digital Eclipse Plus apparatus (Empi, St. Paul, Minnesota). Two electrodes were placed on the lower lumbar or abdominal region and two other electrodes were placed over the right tibial nerve, in order to target the painful area (directly or via the associated dermatome)<sup>[5]</sup>. TENS frequency was set at 3 Hz and the pulse duration at 400 ms, and the intensity was adjusted to produce strong and painful sensations<sup>[5,6]</sup>. For the TENS + tDCS group, a 2 mA direct current was transferred to the patients, through the scalp, by a saline-soaked pair of surface sponge electrodes (5 cm × 7 cm) and delivered by a constant current stimulator, battery-driven, 1 × 1 tDCS device (Model 1300-A; Soterix Medical Inc, New York). Patients received anodal stimulation of the primary motor cortex (M1), as suggested by Fenton *et al.*<sup>[3]</sup> and by Schabrun *et al.*<sup>[4]</sup>. The anodal electrode was placed over M1, contralateral to the most painful site (C3 or C4 according to the electroencephalogram 10/20 system), and the cathodal electrode was placed on the supraorbital area contralateral to the anode<sup>[3,7]</sup>. Both TENS and tDCS were applied for 30 min. Patients who received TENS + tDCS received both stimulations simultaneously. Pain intensity was assessed 4 times during the patients' visit (before, during, after and 15 min following the treatment) using a visual analog scale (VAS) of 10 cm ranges from "no pain" (0 cm) to "the worst imaginable pain" (10 cm). The study was approved by the local institutional ethics committee and written informed consent was obtained from all patients.

As can be seen in Figure 1, there was a slight decrease in pain during treatment; however the pain reduction was not clinically significant and was similar between both groups (average reduction of 1.6 in the TENS group and 1.8 in the TENS+tDCS group)<sup>[8]</sup>. Pain intensity continued to slightly decrease and barely reached clinical significance (2 points on VAS) 15 min after stimulation in the TENS group<sup>[8]</sup>.

These results somewhat contrast with those of Schabrun *et al.*<sup>[4]</sup> who observed a decrease 2.5 in the pain severity score after TENS alone and a decrease of 2.8 after combined TENS and tDCS, a change that was both statistically and clinically significant<sup>[8]</sup>. The inconsistencies between our observations and those of Schabrun *et al.*<sup>[4]</sup> could be explained by the different populations studied (chronic low back pain vs chronic abdominal/pelvic pain). It is also important to mention that the beneficial effect of TENS+tDCS noted by



**Figure 1** Pain intensity assessed with a 10 cm visual analog scale ranges from 0 to 10. Each point represents mean  $\pm$  SEM (standard error of mean). There were 5 patients in the transcutaneous electrical nerve stimulation (TENS) group and 4 patients in the TENS + transcranial direct current stimulation (tDCS) group.

Schabrun *et al.*<sup>[4]</sup> was observed in a subsample of patients only (*i.e.*, in individuals with more pronounced pain sensitization). Different results could have perhaps been obtained if we had included solely chronic abdominal/pelvic pain patients with increased pain sensitization. Furthermore, it should be noted that the effects noted in our patients were observed after one single session of neurostimulation. Providing chronic pain patients with only one tDCS session is perhaps not sufficient to drive important and long-lasting changes in symptoms. Finally, it should be pointed out that 8 of our 9 patients took opioids on a regular basis, a medication that is known to have a negative effect on the reaction to low frequency TENS<sup>[9]</sup>.

In conclusion, our observations suggest that one session of TENS, alone or in combination with tDCS, can slightly reduce pain in patients suffering from chronic abdominal or pelvic pain. However, combining TENS with tDCS does not seem to provide any additional benefit. Contrary to TENS, which can

be self-administered by patients at home during their everyday activities, tDCS must be administered by a healthcare professional. Future studies, looking at the effect of several/consecutive TENS and tDCS sessions should be conducted.

## REFERENCES

- 1 **Chiarioni G**, Asteria C, Whitehead WE. Chronic proctalgia and chronic pelvic pain syndromes: new etiologic insights and treatment options. *World J Gastroenterol* 2011; **17**: 4447-4455 [PMID: 22110274 DOI: 10.3748/wjg.v17.i40.4447]
- 2 **Sharma A**, Lelic D, Brock C, Paine P, Aziz Q. New technologies to investigate the brain-gut axis. *World J Gastroenterol* 2009; **15**: 182-191 [PMID: 19132768 DOI: 10.3748/wjg.15.182]
- 3 **Fenton BW**, Palmieri PA, Boggio P, Fanning J, Fregni F. A preliminary study of transcranial direct current stimulation for the treatment of refractory chronic pelvic pain. *Brain Stimul* 2009; **2**: 103-107 [PMID: 20633407 DOI: 10.1016/j.brs.2008.09.009]
- 4 **Schabrun SM**, Jones E, Elgueta Cancino EL, Hodges PW. Targeting chronic recurrent low back pain from the top-down and the bottom-up: a combined transcranial direct current stimulation and peripheral electrical stimulation intervention. *Brain Stimul* 2014; **7**: 451-459 [PMID: 24582372 DOI: 10.1016/j.brs.2014.01.058]
- 5 **Istek A**, Gungor Ugurlucan F, Yasa C, Gokyildiz S, Yalcin O. Randomized trial of long-term effects of percutaneous tibial nerve stimulation on chronic pelvic pain. *Arch Gynecol Obstet* 2014; **290**: 291-298 [PMID: 24619189 DOI: 10.1007/s00404-014-3190-z]
- 6 **Gokyildiz S**, Kizilkaya Beji N, Yalcin O, Istek A. Effects of percutaneous tibial nerve stimulation therapy on chronic pelvic pain. *Gynecol Obstet Invest* 2012; **73**: 99-105 [PMID: 22269443 DOI: 10.1159/000328447]
- 7 **Antal A**, Terney D, Kühn S, Paulus W. Anodal transcranial direct current stimulation of the motor cortex ameliorates chronic pain and reduces short intracortical inhibition. *J Pain Symptom Manage* 2010; **39**: 890-903 [PMID: 20471549 DOI: 10.1016/j.jpainsymman.2009.09.023]
- 8 **Farrar JT**, Portenoy RK, Berlin JA, Kinman JL, Strom BL. Defining the clinically important difference in pain outcome measures. *Pain* 2000; **88**: 287-294 [PMID: 11068116]
- 9 **Léonard G**, Cloutier C, Marchand S. Reduced analgesic effect of acupuncture-like TENS but not conventional TENS in opioid-treated patients. *J Pain* 2011; **12**: 213-221 [PMID: 20870464 DOI: 10.1016/j.jpain.2010.07.003]

**P- Reviewer:** Thota PN, Kraja B, Rubbini M **S- Editor:** Qi Y  
**L- Editor:** A **E- Editor:** Wang CH







Published by **Baishideng Publishing Group Inc**  
7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA  
Telephone: +1-925-223-8242  
Fax: +1-925-223-8243  
E-mail: [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)  
Help Desk: <http://www.f6publishing.com/helpdesk>  
<http://www.wjgnet.com>



ISSN 1007-9327

