

Extending the role of a counsellor: Experience from an Australian clinical and research interdisciplinary spinal centre*

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Summary: We describe the development of and experience with an extended role for a counsellor at an independent interdisciplinary Australian Spinal Centre. A bespoke professional, clinical and research educational program was designed, and the counsellor then applied these skills to patients with chronic low back pain (CLBP) in a Clinical Care Pathway (CPW) and a prospective clinical research project. Between November 2021 and February 2025, the counsellor assessed 160 patients in the preoperative component of the CPW and followed up 18 with moderate or severe levels of mood disorder (mean 3.5 sessions each). In the research study evaluating neuropathic pain, the Counsellor recruited and assessed 96 patients between August 2022 and December 2024. The clinical role of a Counsellor can be successfully extended in the appropriate clinical and research environment. This model has major cost-benefit implications for service delivery and research.

Introduction

Within Australia there are several ways to achieve the necessary qualifications to become a Counsellor and a diverse range of employment opportunities once qualified (Australian Institute of Professional Counsellors, 2025). Professional clinical and academic career progression can be undertaken with a range of post-graduate studies or diploma courses. Such additional

studies widen career choice and expertise but may be both costly and difficult to undertake depending on individual circumstances. In this study we describe a bespoke career development program for a counsellor employed at an independent interdisciplinary spinal centre that manages patients with chronic low back pain (CLBP). The centre has senior clinical and allied health staff, as well as senior clinical research personnel, with backgrounds in medical education, clinical research and clinical service delivery. Previously we have described an extended role for medical general practitioners in the management of patients with CLBP (Whittle et al, 2023). Using the same principles (Gervas et al, 2007), we designed a course that extended the role of the counsellor at the centre.

The background to this study was generated by several factors. Firstly, there was an increasing number of patients with chronic low back pain (meaning pain persisting for more than 12 weeks) seen at our centre. Most of these patients have signs and symptoms attributable to various musculoskeletal degenerative conditions and the aetiology is termed “mechanical” LBP (Foster et al, 2018). Management of this cohort is challenging since the biopsychosocial factors contributing to the condition may cause long term disruption and restriction of social interactions, leisure and work activities (Anselmo et al, 2024; Kamper et al, 2015). This may lead to secondary disturbances in mood and behaviour (Demyttenaere et al, 2007; Stubbs et al, 2016).

Secondly, recent studies have shown that in selected patients a novel way of treating their mechanical CLBP is by surgically implanting a device that electrically stimulates the L2 medial branch dorsal rami nerves in the lumbar spine. This neurostimulation causes contraction of a lumbar paraspinal muscle called multifidus and is termed “restorative neurostimulation” (Chakravarthy et al, 2022). Clinical trials have reported significant

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reductions in both CLBP and disability that can last up to five years following this therapy (Gilligan et al, 2024; Schwab et al, 2025). To improve outcomes in these patients, we have developed an interdisciplinary Clinical Care Pathway (CPW) that incorporates the biopsychosocial approach to managing CLBP (Huang et al, 2025). This CPW offers scheduled, streamlined management of the patient from their initial introduction to the therapy until at least 24 months after insertion of the device. The CPW was not only designed to optimise patient care but also to provide a model by which collection of sequential outcome data could be attained to enable “real world” clinical outcomes to be compared to data from successful prospective clinical trials (Whittle et al, 2024; Huang et al, 2025). Additionally, it also provided an ideal infrastructure in which prospective academic clinical studies in this cohort could be performed.

In the CPW we chose to assess and support the mental wellbeing of these patients using a counsellor. Given significant mood disorders are reported in only about 14 per cent of patients with CLBP undergoing restorative neurostimulation (Thomson et al, 2021), most patients do not need to see a clinical psychologist but still require mental health screening. We therefore embedded a counsellor into both the pre-operative (screening) part of the CPW and the two-year postoperative follow up period. Prior to this project the counsellor, who was appointed in June 2020, saw patients referred to the centre with a range of musculoskeletal spinal disorders on an ad hoc basis. The counsellor's background qualification was a Diploma in Counselling (2020) from the Australian Institute of Professional Counsellors (AIPC). Once established in their clinical role, their position and client profile also provided the opportunity to seamlessly perform research studies on the patients with CLBP in the CPW.

Here we report; (i) how specialised training prepared the counsellor for the role in the CPW; (ii) the counsellor's experience in the assessment and management of patients in the preoperative and post-operative CPW; (iii) how we were able to seamlessly add in a prospective clinical research role for the counsellor within the CPW setting; and (iv) the counsellor's contribution to recruitment and assessment of patients in the research project; and (v) lessons learnt and implications of the model.

Methods

Setting

This study was undertaken at an independent Australian capital city interdisciplinary spinal centre that has a large clinical service and dedicated research facility.

Training of the counsellor for the extended role in the CPW

A series of in-house tutorial sessions were delivered by senior members of the clinical, allied health and research staff at the spinal centre. Topics covered included the scientific basis of CLBP and aspects of its assessment and management. Observing clinical sessions of patients being assessed and treated for CLBP were also organised. Relevant aspects of Good Clinical Practice (GCP) in human clinical research were taught. Practical training on recruiting and assessing patients on several well validated and widely used questionnaires was either consolidated or taught.

Design of the Clinical Care Pathway (CPW)

A CPW for patients having restorative neurostimulation using the ReActiv8 device (Mainstay Medical, San Diego, CA) for mechanical CLBP was designed using the four basic principles outlined for a CPW (Kinsman et al, 2010) and Laval et al (2017).

The CPW was developed after a dedicated interdisciplinary workshop that included the counsellor in August 2021. Details of and experience with the first two years of this CPW have recently been published (Huang et al 2025). In brief, and relevant to this paper, the counsellor has a pre-operative screening and assessment role for all prospective patients and a postoperative role for selected patients, as expanded upon below.

Role of the counsellor pre-operation

The counsellor's first role in the CPW was to screen and assess the wellbeing of potential patients for this therapy in a pre-operative assessment session. This involved a structured interview, that is based on the 5A model for Assessment and Intervention in Integrated Healthcare (Glasgow et al, 2006) with a duration of 45 mins for the initial consultation. Using the 5A model, the counsellor can incorporate assessments of mental status using the Depression Anxiety Stress Scale 21 (DASS21) (Henry et al, 2005) and the neuropathic pain component of the patients CLBP using the PainDETECT questionnaire (Freyenhagen et al, 2006) and also determine what if any further care is required for the patient. All this information was relayed to the senior spinal surgical consultant and used to facilitate decision making about:

- (i) the patient's suitability for the restorative neurostimulation, since this therapy is primarily aimed at patients with mechanical CLBP, which is nociceptive in origin rather than neuropathic
- (ii) whether clinical psychological intervention was deemed necessary
- (iii) whether the patient would benefit from longitudinal counselling later in the CPW

In addition, and as part of a research project designed to explore differences in the incidence of neuropathic pain documented using two different internationally recognised and recommended questionnaires (PainDETECT and the Short-Leeds Assessment of Neuropathic Symptoms and Signs (S-LANSS (Bennett et al, 2005)) the counsellor also guided the patients in completing the latter questionnaire during the consultation. Secondary aims of this project were to evaluate the inter-relationships between neuropathic pain and (i) demographic features (gender and age); (ii) mental status scores from the DASS21; (iii) prior spinal lumbar surgery; (iv) patient compensation claims; and (v) evaluate which questionnaire the patients felt was best representative of their pain and easier to fill in.

Role of the counsellor at the postoperative CPW clinic

The post-operative part of the CPW is designed for the care of patients with ReActiv8 neurostimulation devices only and is delivered at a “one-stop” clinic. At this clinic all the patients see the therapy manager (who adjusts the stimulus parameters on the implantable programmable device), a medical doctor who assesses pain, medication and general medical condition, and an exercise physiologist who assesses the patient's movement functions at the same visit. The counsellor reviews only those patients identified either (i) before surgery or (ii) after surgery as needing or potentially benefiting from post-operative counselling.

Therapies such as Cognitive Behaviour Therapy (CBT), Dialectical Behaviour Therapy (DBT), Solution Focused Therapy, breathing and relaxation exercises were introduced and used in 60-minute sessions. It is important to note that the counsellor was aware of their duty of care and limitations in scope of practice. The fact that the Spinal Centre is an interdisciplinary centre with collaborative clinical disciplines involved in the

planning and execution of patient centric care, uses a central shared electronic medical records system, a common clinical consulting area (with separate rooms) as well as face to face meetings and teleconferences, facilitated communication using cross-referral and consultation with other clinicians, including clinical psychologists.

Ethics

The research studies covered in this report were approved by the Low Risk Adelaide University Human Research Ethics Committee (HREC). They were HREC Approval numbers H-2022-110, Assessing Neuropathic Pain components using PainDETECT and S-LANSS; and H-2023-307, A single Centre audit of outcome following ReActiv8 therapy for chronic low back pain.

Results

Training of the counsellor

From June to November 2021, the counsellor underwent an intensive period of education, learning and practical experience concerning CLBP and aspects of its assessment and management. The educational sessions covered basic spinal anatomy; CLBP; pain mechanisms and its management (with emphasis on the biopsychosocial model), and commonly used medications for CLBP. The counsellor also attended clinical sessions that covered (i) General Practice and specialist spinal surgical consultations with patients suffering from CLBP; (ii) Exercise Physiology and Physiotherapy consultations with CLBP patients, particularly those being assessed for and managed with restorative neurostimulation devices; and (iii) how the implanted programmable neurostimulation devices, designed to alleviate CLBP, are programmed by therapy managers. These sessions provided insight into each discipline's particular role in the CPW and allowed the counsellor to become acquainted with her interdisciplinary colleagues providing the "one-stop" restorative neurostimulation clinic. Attendance was also organised for operating theatre visits that included observing open spinal surgery (discectomy and lumbar decompressions), insertion of neurostimulator devices to control chronic pain and image guided spinal interventional therapies designed to alleviate CLBP (radiofrequency denervation and epidural steroid injections).

From February to August 2022, training on the theoretical, practical and clinical use of the DASS21, PainDETECT and S-LANSS questionnaires, as well as recording and storing human clinical research data was provided by a senior clinical researcher (the counsellor had previous knowledge of the DASS21). Calculating questionnaire scores and their interpretation were taught directly and using web-based tools. Instruction in Good Clinical Practice (GCP) was provided and an Online Course successfully completed (10 Aug 2022) and certificate awarded (Investigator and Site Personnel GCP (ICH GCP) Training, Genesis Research Scheme

The counsellor's experience during the pre-operative stage

Since the inception of the Restorative Neurostimulation CPW in November 2021 until February 2025, the counsellor has assessed 160 new patients (86 female, 74 male; mean age 58 yrs: median 59 yrs, range 23-89); see Table 1.

Year	New Patients	Review Appointments	Total Appointments
2021 (Nov-Dec)	4	2	6
2022	63	15	78
2023	54	28	82
2024	37	30	67
2025 (Jan-Feb)	2	2	4
Totals	160	77	237

Table 1: The workload of the Counsellor in the pre-operative (New Patients) and postoperative (Review Appointments) components of the Restorative Neurostimulation Clinical Care Pathway from November 2021 until February 2025.

From August 2022 until the end of December 2024, 96 of these patients had their DASS21 scores recorded. Between 70-79 per cent of these patients scored within the either the normal or mild ranges for depression, anxiety and stress; 16-24 per cent scored in the moderate range, whilst 5 per cent scored in the severe category. Nobody scored in the extremely severe category for any mood disorder (see Table 2).

Grade	Depression Score on DASS	Depression Incidence / %	Anxiety Score on DASS	Anxiety Incidence / %	Stress Score on DASS	Stress Incidence / %
Normal	0-9	57 (59%; CI 49-69%)	0-7	66 (69%; CI 58-78%)	0-14	61 (64%; CI 53-73%)
Mild	10-13	11 (11%; CI 6-20%)	8-9	10 (10%; CI 5-18%)	15-18	7 (7%; CI 3-14%)
Moderate	14-20	23 (24%; CI 16-34%)	10-14	15 (16%; CI 9-24%)	19-25	23 (24%; CI 16-34%)
Severe	21-27	5 (5%; CI 1-12%)	15-19	5 (5%; CI 1-12%)	26-33	5 (5%; CI 1-12%)
Extremely Severe	28+	0	20+	0	33+	0

Table 2: Grade and incidence of depression, anxiety and stress in 96 patients with CLBP assessed by the counsellor using the DASS21 self-report questionnaire. The Confidence Intervals (CI) are reported at the 95 per cent level.

The Counsellor's role in the post-operative stage

Eighteen patients implanted with the ReActiv8 neurostimulation device (11%; 95% CI 7-17%) underwent post-operative counselling within the CPW (median 3.5 sessions each) and 3 were referred back to their psychologists. Counselling techniques introduced and used included CBT, DBT, Solution Focused Therapy, breathing techniques and relaxation exercises.

The counsellor's role in prospective clinical research

By incorporating the DASS21, PainDETECT and S-LANSS questionnaires in their initial assessment of patients in the CPW, the counsellor was able, between August 2022 and December 2024, to seamlessly recruit 97 patients for a prospective clinical trial. One patient completed the assessments but declined to sign the necessary written consent form for inclusion of their data in the research study. Thirteen of the 96 (14%; 95% CI 7-22%) had neuropathic pain on the PainDETECT questionnaire and 12 (13%; 95% CI 7-21%) on the S-LANSS questionnaire.

The counsellor met regularly with the director of research to monitor the project's progress, audit the research data, assist in annual reports to the HREC and an amendment to the HREC to increase the study sample size after an interim analysis of data. Preliminary data was presented at the Annual Scientific Meeting of the Spine Society of Australia (SSA) in Sydney April 2024 as a Top 10 poster. The extended role was presented at the subsequent SSA meeting in Perth April 2025 as an oral podium presentation. PainDETECT data for the patients in the restorative neurostimulation CPW was included in two articles recently published in the journal *Neuromodulation* (Huang et al, 2025; Whittle et al, 2024).

Discussion

In this study we have described an extended clinical role for a counsellor undertaken at an independent spinal centre that has its own dedicated research facility. The concept of "extended roles" has been used widely in general medical practice (Gervas et al, 2007; Whittle et al, 2023). The purpose of such clinicians is for them to be able, for a portion of their time, to offer a consultant-like role whilst still practising in primary care (Gervas et al, 2007). This improves patient access to necessary opinions, reduces patient costs, increases clinician self-esteem and job satisfaction and also increases patient satisfaction with their management. This study reports our experience with extending the role of an early career counsellor, who without added university undergraduate experience, was highly motivated and eager to accept the challenges of the extended role.

The project has been very successful in various domains. Firstly, it has provided a sympathetic and appropriately trained staff member who can perform an important clinical role in the initial assessment of CLBP patients interested in restorative neurostimulation. Secondly, it has provided supportive, continuing care for those patients with moderate mental health issues in the restorative neurostimulation CPW. Thirdly, it has provided data that assists understanding of the interplay between impaired mental health and the incidence and severity of neuropathic pain. Fourthly, it has provided a platform on which a dedicated research project was successfully completed; and finally, it provided the infrastructure and support through which the counsellor obtained extended experience in structured clinical care delivery and novel insights into participation and execution of clinical research.

The success of the project was due to the interplay of:

- A highly motivated, inquisitive counsellor who wished to develop their clinical skills through Continued Professional Development (CPD)

- The presence of thoughtful and proactive educators at the centre who are eager to explore extending responsibilities and providing professional development opportunities for medical and allied health staff
- The availability of dedicated senior clinical researchers seeking opportunities for allied health care personnel to acquire insight into and partake in the conduct of clinically relevant research whilst performing their routine clinical practice
- The clinical need at our centre for a Counsellor suitably trained to assess and triage the increasing number of CLBP patients
- The setting of a spinal centre with an interdisciplinary patient focussed approach to management of CLBP and multiple pathways of inter practitioner communication

The counsellor's personal reflections on their extended role were also very positive. They enjoyed the range of patients seen and the social issues uncovered that could be adding to the patient's mood disequilibrium. This was particularly relevant with respect to the significance of a patient's DASS21 scores, since this tool provides only a snapshot of how multiple issues in patients lives are perceived and reconciled. They also noted that many clients/patients are often reluctant and a little sceptical when asked to participate in a counselling session (particularly those aged in the late 50's to 70's). It often took the initial five minutes of the consultation to reassure them that they have not been pre-diagnosed with a mental health condition because they have CLBP. Once the counsellor's role was explained the patient would relax and progress through the session. This "destigmatisation" of the need to see a counsellor meant that frequently the patient would leave the session reassured and thankful for the service provided. This qualitative observation is supported by the high levels of satisfaction recorded in an independent assessment of patient satisfaction with the CPW (Huang et al, 2025).

The concept and execution of this project was similar to that devised for extending the role of general practitioners (GP) in spinal medicine and surgery at the centre (Whittle et al, 2023). In both situations there was a pressing clinical service need for this extended role, and the persons undertaking the extended roles were supported by the ready availability of other medical and research staff members – either at the clinic or in very close proximity in other consulting rooms. Discussion about specific patients and research findings was also undertaken to encourage reflective practice and inquisitiveness about the limits of tools used in clinical research projects. The counsellor actively partook in audit of her practice and the preparation and writing of two published manuscripts and one oral presentation at a national scientific meeting that emanated either in part or fully from their research endeavours (Huang et al, 2025; Whittle et al, 2024).

In terms of putative financial costs for the clinical and research service, there were considerable benefits despite the time required by the senior staff in organising, preparing and conducting the additional training. Appointing a clinical psychologist to perform the initial mental health screening assessments in the CPW would have been an expensive undertaking for the Centre, costly for patients and done with the knowledge that such practitioners are in short supply. Also, because of the relatively low frequency of severe mental health disorders in the restorative neurostimulation focussed CLBP population, job satisfaction for a clinical psychologist may have been low with such a role. In comparison, the counsellor felt challenged by the role and took major satisfaction from the addition of the research aspect and their "ownership" of that data.

From the research team perspective, the enthusiasm of the counsellor for the project gave it considerable momentum as well as adding both an important dimension to the research data for this cohort and an additional source of expertise for

studies. The lost time that would have been invested, and the other challenges of obtaining an externally funded research grant, which statistically has a poor chance of success, were also obviated by using the counsellor as a research associate. Testimony to the validity of the counsellor's research finding were the neuropathic pain incidence of 12-15 per cent in our cohort, which is very similar to previous reports in this field (Forster et al, 2000). The incidence of mood disorders on the DASS21 was also similar to previous findings (Thomson et al, 2021). The distribution of the DASS21 data also showed that this CLBP cohort has a decrease of between 15-20 per cent in the number of people with no or mild levels of depression, anxiety and stress and an approximately four-fold increase in "moderate" levels of depression, anxiety or stress compared to a control population (Crawford and Hendy, 2003). These figures lie between previous high and low estimates of the increase in depression, anxiety, and stress associated with CLBP (Demyttenaere et al, 2007; Stubbs et al, 2016; Zvolensky et al, 2025).

Although our Centre was well staffed and structured to successfully develop this extended role for a counsellor, it is possible similar approaches could be taken at other centres to realise the full spectrum of a counsellor's skills.

References

- Anselmo A., Pagano M., Cappadona I., Cardile D., Russo F., Laudisio A., Papalia G.F., Quartarone A., Calabrò R.S., Corallo F. (2024) A Systematic Review on the Neuropsychological Assessment of Patients with LBP: The Impact of Chronic Pain on Quality of Life. *Journal of Clinical Medicine*, Oct 15;13(20):6149. doi: 10.3390/jcm13206149. PMID: 39458099; PMCID: PMC11508970.
- Australian Institute of Professional Counsellors, (2025). *How to become a counsellor in Australia*. www.aipc.net.au/how-to-become-a-counsellor-in-Australia. Accessed Jan 31 2025
- Bennett M.I., Smith B.H., Torrance N., Potter J. (2005). The S-LANSS score for identifying pain of predominantly neuropathic origin: validation for use in clinical and postal research. *Journal of Pain Research*, Mar;6(3):149-58. doi: 10.1016/j.jpain.2004.11.007. PMID: 15772908
- Chakravarthy K., Lee D., Tram J., Sheth S., Heros R., Manion S., Patel V., Kiesel K., Ghandour Y., Gilligan C. (2022) Restorative Neurostimulation: A Clinical Guide for Therapy Adoption. *Journal of Pain Research*, Jun 20;15:1759-1774. doi: 10.2147/JPR.S364081. PMID: 35756364; PMCID: PMC9231548.
- Crawford J.R., Henry J.D. (2003). The Depression Anxiety Stress Scales (DASS): normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology*, Jun;42(Pt 2):111-31. doi: 10.1348/014466503321903544. PMID: 12828802.
- Demyttenaere K., Bruffaerts R., Lee S., Posada-Villa J., Kovess V., Angermeyer M.C. et al. (2007). Mental disorders among persons with chronic back or neck pain: results from the World Mental Health Surveys. *Pain*, Jun;129(3):332-342. doi: 10.1016/j.pain.2007.01.022. Epub 2007 Mar 9. PMID: 17350169.
- Förster M., Mahn F., Gockel U., Brosz M., Freynhagen R., Tölle T.R., Baron R. (2013). Axial low back pain: one painful area—many perceptions and mechanisms. *PLoS One*, Jul 2;8(7):e68273. doi: 10.1371/journal.pone.0068273. PMID: 23844179; PMCID: PMC3699535.
- Foster N.E., Anema J.R., Cherkin D., Chou R., Cohen S.P., Gross D.P., et al. (2018). Lancet Low Back Pain Series Working Group. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *Lancet*, Jun 9;391(10137):2368-2383. doi: 10.1016/S0140-6736(18)30489-6. Epub 2018 Mar 21. PMID: 29573872.
- Freynhagen R., Baron R., Gockel U., Tölle T.R.. painDETECT: a new screening questionnaire to identify neuropathic components in patients with back pain. (2006). *Current Medical Research and Opinion*, Oct;22(10):1911-20. doi: 10.1185/030079906X132488. PMID: 17022849.
- Gérvás J., Starfield B., Violán C., Minué S. (2007). GPs with special interests: unanswered questions. *British Journal of General Practice*, Nov;57(544):912-7. doi: 10.3399/096016407782317865. PMID: 17976293; PMCID: PMC2169316.
- Gilligan C., Volschenk W., Russo M., Green M., Gilmore C., Mehta V., et al. (2024). Five-year longitudinal follow-up of restorative neurostimulation shows durability of effectiveness in patients with refractory chronic low back pain associated with multifidus muscle dysfunction. *Neuromodulation*, Jul;27(5):930-943. doi: 10.1016/j.neurom.2024.01.006. Epub 2024 Mar 12. PMID: 38483366.
- Glasgow R.E., Emont S., Miller D.C.. Assessing delivery of the five 'As' for patient-centered counseling. (2006). *Health Promotion International*, Sep;21(3):245-55. doi: 10.1093/heapro/dal017. Epub 2006 Jun 2. PMID: 16751630.
- Henry J.D., Crawford J.R. (2005) The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, 44(Pt 2):227-39.
- Huang A.J., Yull D., Yau Y.H., Selby M., Craig K., Bass T., et al. (2025). A clinical care pathway for patients with chronic mechanical low back pain having restorative neurostimulation for multifidus muscle: description, patient compliance, clinical outcomes, and satisfaction in the first two years. *Neuromodulation*, Jan 20:S1094-7159(24)01272-8. doi: 10.1016/j.neurom.2024.12.004. Epub ahead of print. PMID: 39831866.
- Kamper S.J., Apeldoorn A.T., Chiarotto A., Smeets R.J., Ostelo R.W., Guzman J., van Tulder M.W. (2015). Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: Cochrane systematic review and meta-analysis. *BMJ*, Feb 18;350:h444. doi: 10.1136/bmj.h444. PMID: 25694111; PMCID: PMC4353283.
- Kinsman, L., Rotter, T., James, E., Snow, P., & Willis, J. (2010). What is a clinical pathway? Development of a definition to inform the debate. *BMC Medicine*, 8. Medline plus. (2018). Retrieved from <https://medlineplus.gov/ency/imagepages/18126.htm>
- Lawal, A.K., Rotter, T., Kinsman, L. et al. (2016). What is a clinical pathway? Refinement of an operational definition to identify clinical pathway studies for a Cochrane systematic review. *BMC Med* 14, 35. <https://doi.org/10.1186/s12916-016-0580-z>
- Schwab F., Mekhail N., Patel K.V., Langhorst M., Heros R.D., Gentile J., et al.; RESTORE investigators. (2025). Restorative neurostimulation therapy compared to optimal medical management: A randomized evaluation (RESTORE) for the treatment of chronic mechanical low back pain due to multifidus dysfunction. *Pain and Therapy*, Feb;14(1):401-423. doi: 10.1007/s40122-024-00689-0. Epub 2025 Jan 15. PMID: 39812968; PMCID: PMC11751280.
- Stubbs B., Koyanagi A., Thompson T., Veronese N., Carvalho A.F., Solomi M., et al. (2016). The epidemiology of back pain and its relationship with depression, psychosis, anxiety, sleep disturbances, and stress sensitivity: Data from 43 low- and middle-income countries. *Gen Hosp Psychiatry*, Nov-Dec;43:63-70. doi: 10.1016/j.genhosppsych.2016.09.008. Epub 2016 Sep 30. PMID: 27796261.
- Thomson S., Chawla R., Love-Jones S., Sharma M., Vajramani G., Williams A., et al; ReActiv8 PMCF Investigators. (2021). Restorative neurostimulation for chronic mechanical low back pain: Results from a prospective multi-centre longitudinal cohort. *Pain and Therapy*, Dec;10(2):1451-1465. doi: 10.1007/s40122-021-00307-3. Epub 2021 Sep 3. PMID: 34478115; PMCID: PMC8586272.

- Whittle I.R., Yull D., Yee J., Czechowicz G., Murphy P., Clausen E. *et al.* (2023). Using general practitioners with an extended role in spinal practice for the initial assessment of patients referred to spinal surgeons: preliminary experience and challenges. *Prim Health Care Res Dev*, Jan 26;24:e9. doi: 10.1017/S1463423622000494. PMID: 36700455; PMCID: PMC9884532.
- Whittle I.R., Yull D., Huang A., Fish S., Chene D., Selby M. *et al.* (2025). Restorative neurostimulation of the multifidus for chronic low back pain after prior lumbar spinal surgery: A single-center, consecutive case series. *Neuromodulation*, Feb;28(2):297-305. doi: 10.1016/j.neurom.2024.10.011. Epub 2024 Dec 10. PMID: 39665721.
- Zvolensky M.J., Smit T., Rogers A.H., Bakhshaie J., Ditre J.W., Rinker D.V. (2025). Differences in anxiety, depression and pain experience among adults with chronic low back pain as a function of nicotine product use. *Journal of Behavioural Medicine*, Jan 9. doi: 10.1007/s10865-024-00547-6. Epub ahead of print. PMID: 39789403.