



ECU 2022
CONVENTION 27-29 MAY
UTRECHT THE NETHERLANDS

BOOK OF ABSTRACTS

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ECU2022

BOOK OF ABSTRACTS

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WELCOME ADDRESS

Dear colleagues,

The ECU Convention has always been special for me – showcasing, as it does, the best and the most challenging ideas from the European chapter of the chiropractic profession. Without fail, I have come away from these events enriched by hearing about developments in research, clinical practice and the wider world of healthcare. Not all of this has been comfortable, but I can honestly say that the Convention has helped me become a better practitioner, more aware of how much patient value we can create in collaboration with each other and with fellow healthcare professionals.

Returning to the Netherlands, following the 2020 cancellation, makes it even more special! Together with our colleagues at the Netherlands Chiropractors' Association, we invite you to a stunning 21st-century venue in the charming city of Utrecht. Resembling a smaller Amsterdam, it has its canals and cosy outdoor living, and it is also well on the way to being an exemplary green city with a thriving science park and medical institutes.

As you'll see from the academic programme, delegates will be able, amongst other things, to enlarge their knowledge of the EPIC principles explored at our last physical Convention. Still, by far, and in my personal opinion the most important thing we will all be taught in this Convention, is included in its theme: *Stronger Together*. The pandemic brought with it immeasurable suffering and disruption. The least we must do is learn the lessons it brought, and none is more important than the importance of 'togetherness'.

We will all, once more, engage with speakers, workshop leaders and our colleagues. I am looking forward to sharing every minute of it with you!

Vasileios Gkolfinopoulos, ECU President

INTRODUCTION TO THE ACADEMIC PROGRAMME

Dear colleagues, geachte collegae,

Welcome to Utrecht – Welkom in Utrecht!

See, Dutch is not so difficult when you look for commonalities, right? Hopefully, we'll find a lot of common ground over the days of the ECU Convention in Utrecht.

The Netherlands is a loud and proud big little country, with an entrepreneurial tradition for shaping the world and the land we live on to our advantage – just think of Shell, Phillips, the VOC and the 17th century canals! In the same tradition, there is a spirit and willpower to lead when it comes to musculoskeletal research and innovation.

The largest European meeting of evidence-based chiropractors, the theme of the 2022 ECU Convention is *Stronger Together*. We have put together an academic programme bursting with talent, whether it be local or imported – here's your chance to see a lot of your heroes IRL, the names of whom are on every relevant article. A fair number of presenters come from outside the chiropractic profession. This is in line with the vision we have for chiropractic – that we are stronger together, that we naturally collaborate and share knowledge and insights with numerous other clinicians and researchers, as we take part in a global movement to improve the health of our patients.

Outside of the Convention, we have done away with the formal gala dinner and decided to simply throw you a phenomenal Dutch party with all kinds of fun, dancing and surprises! This includes live music and a scrumptious sampling of the Dutch cuisine, right in the heart of the old city.

Gitte Tønner

On behalf of the Netherlands' Chiropractors' Association and the local organising team

ACKNOWLEDGEMENTS

The European Chiropractors' Union would like to thank and express their appreciation to the following organisations for their continued support and assistance.

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INVITED SPEAKERS AND CHAIRS (in alphabetical order)



Luc Ailliet: Born in 1965, long-time married to the mother of two sons, Luc's background is as a physiotherapist (Msc Physiotherapy – University of Ghent 1989), practising chiropractor (Summa cum Laude National College of Chiropractic (now NUHS), Chicago USA 1996) for 25 years and researcher (PhD in Epidemiology and Biostatistics from the Faculty of Medicine at the Vrije Universiteit Amsterdam, the Netherlands in 2016). This allows him to 'peek over the fence' of the chiro-world and see what goes on immediately around us. His PhD focused on the biopsychosocial context of patients consulting chiropractors with spinal pain.



Iben Axén is an AECC graduate with 28 years of practice in Stockholm, Sweden. Parallel to clinical practice, she has been involved in a Practice-Based Research Network. She earned her PhD at Karolinska Institutet in 2011 and became an Associate Professor in 2016. She is Research Leader of the Norwegian Chiropractic Research Foundation ELIB. Her research is clinical, and topics include pain trajectories, predictors of treatment outcome and prevention. She is co-Editor-in-Chief of *Chiropractic & Manual Therapies*.

Awards: Junior Research prize of the ECU in 2010 and the Jean Robert Research Award in 2017. Chiropractor of the Year in Sweden in 2011.



Simon Billings is the founder of the Academy of Chiropractic Nutrition, a system of nutrition and functional medicine for chiropractors. Delivered online, its focus is the interface between the metabolic side of health and the neuromechanical system, to allow chiropractic care to work optimally. A graduate from the AECC in 2001, in clinical practice Simon splits his time between chiropractic care and a virtual clinic for nutrition/functional medicine.

www.academyofchiropracticnutrition.com

simon@academyofchiropracticnutrition.com

Virtual clinic: integrativecare.co.uk



Richard Brown has served as the Secretary-General of the World Federation of Chiropractic since 2015, prior to which he was the Secretary and first Secretary-General of the ECU. A 1990 graduate of AECC University College, he worked continuously in private practice for 25 years, during which time he was the President of the British Chiropractic Association. In the area of public health, he coordinates World Spine Day and has extensive experience of working with the World Health Organization. He has co-authored publications on the subjects of rehabilitation, chiropractic and public health and global musculoskeletal strategy. Besides his chiropractic qualification, Richard has a Master of Laws degree from Cardiff University.



David Byfield has been in private practice and chiropractic education for the past 43 years in Canada, England and Wales. David joined the University of South Wales in 1998 following teaching posts at CMCC and AECC to develop an integrated masters chiropractic degree programme. He was Head of the Welsh Institute of Chiropractic (WIOC) and is currently the Head of Clinical Services in the Faculty of Life Sciences and Education. He was recently conferred Professor in Professional Practice in May 2018 for his clinical and educational contribution. David has written three chiropractic educational textbooks related to chiropractic manipulative skills learning and teaching, and has published a number of scientific papers including book chapters covering spinal manipulation and rehabilitation. David has been a member of the General Chiropractic Council in the UK and currently sits on the European Council on Chiropractic Education and contributes to the European Academy of Chiropractic as Chair of the Special Interest Group Clinical Chiropractic. David is currently enrolled as a PhD student at USW investigating the relationship between spinal pain, physical inactivity and cognitive decline.



Jake Cooke graduated from the AECC in 2009 and passed the American Chiropractic Neurology Board exams in 2014. In 2021, he completed his Masters in MSK Neuroscience with a focus on chronic pain and dizziness/balance disorders. He's the current Chairman for the European Academy of Chiropractic's neurology special interest group, with the goal of showing how neurology can be used to improve diagnosis, treatment and outcomes.



Professor Pierre Côté is an epidemiologist and a chiropractor. He holds the Canada Research Chair in Disability Prevention and Rehabilitation and he is a Professor in the Faculty of Health Sciences at the University of Ontario Institute of Technology. He is also the Director of the Institute for Disability Prevention and Rehabilitation at Ontario Tech University and a Professor of Epidemiology at the Dalla Lana School of Public Health at the University of Toronto.

Throughout his career, Professor Côté has contributed to several evidence-based policy initiatives. From 2019-2021, he led several systematic reviews of the literature to inform the development of evidence-informed regulatory policies by the College of Chiropractors of British Columbia.

Professor Côté is actively involved with various projects with the World Health Organization (WHO). In particular, in 2020, he was responsible for writing the daily WHO COVID-19 Research Digest and he is a member of the WHO Development Group for programs of rehabilitation for low back pain. His current research focuses on the etiology of disability and the rehabilitation of musculoskeletal pain and mental health. Professor Côté has published more than 300 scientific papers in peer-reviewed journals.



Igor Dijkers graduated from Wageningen University, MSc biology (1999) and from AECC in 2005. He has continued his education in postgraduate neurology since. He passed the diplomate exam of the American Board of Chiropractic Neurology in 2007 and later passed exams for fellowships in a.o. vestibular rehabilitation, and brain injury and rehabilitation. Igor has been the chair of the scientific committee of the NCA (Netherlands) for several years whilst serving as board member. Igor has been lecturing at several ECU and WFC conventions, had poster presentations at international congresses (IAFNR and Barany) and guest lectured at different medical institutes in the Netherlands. Igor is current Chair of the European Academy of Chiropractic (EAC).



Jonathan Field graduated from AECC in 1987. He is clinical lead for a team of chiropractors, osteopaths and physiotherapists providing community based MSK care as part of an integrated and state funded NHS pathway. His PhD is in the collection and use of patients reports of their outcome and satisfaction. As chair of the specialist faculties forum for the Royal College of Chiropractors he facilitates the development and recognition of enhanced skills and competences developed by chiropractors. Jonathan represents the chiropractic profession on the UK National Low Back Pain Clinical Network which works on behalf of the NHS to promote evidence based care within hospital and community spinal services.



Vasileios (Vas) Gkolfinopoulos has been in private practice in the UK and Greece for the past 20 years. He graduated from the Anglo-European College of Chiropractic in Bournemouth, UK in 1999 where he received a BSc(Hons) and an MSc degree in Chiropractic. He went on to receive an MPhil in Research from the University of Glamorgan, UK where he was also a lecturer at the Welsh Institute of Chiropractic for a period of three years. A member of the British Chiropractic Association from 1999 to 2002, he is currently a member and has served as the President of the Hellenic Chiropractors' Association from 2004 to 2018. He also served as Treasurer of the European Chiropractors' Association (ECU) from 2010 to 2018. He is the current ECU President since 2018, as well as a Fellow of the European Academy of Chiropractic and a member of the Governing Board of the European Centre for Chiropractic Research Excellence. Before chiropractic, Vas studied at the Physical Education and Sports Science Department at the University of Athens, Greece. A pro-level water-polo player in his youth, he has participated in seven Greek premier leagues, won two Greek youth championships with his club, played for the Greek national youth team and participated in a final four phase of the European Championship. He has served in the Greek Air Force Medical Service Corps. He is happily married and has three children.



Christine Goertz is a Professor in Musculoskeletal Research and Director of System Development and Coordination for Spine Health at Duke University School of Medicine and CEO of the Spine Institute for Quality. She also currently serves as Chairperson of the Board of Governors for the Patient Centered Outcomes Research Institute. Christine received her doctor of chiropractic degree from Northwestern Health Sciences University and her Ph.D. from the University of Minnesota School of Public Health. She has received more than \$35M in federal funding as principal investigator and co-authored over 120 peer-reviewed papers.



and care settings.

Professor Lesley Haig is Vice Chancellor of AECC University College in the UK. She is a UK-registered physiotherapist who has worked in a variety of roles as a senior academic, researcher and clinician in several UK universities and practice settings. Lesley has many years of experience in training healthcare practitioners in motivational interviewing (MI) which was also the focus of her doctoral research. MI is a psychologically informed approach defined as a collaborative, goal-oriented style of communication. MI has been widely recommended as a complex behaviour change intervention for implementation across a range of health



Lise Hestbaek graduated in chiropractic in 1990 from Palmer College of Chiropractic. She was a practising chiropractor 1991-2007 in England and Denmark; from 1997 – 2007 this was part-time research and part-time clinic, then from 2007 Lise moved into full-time research and teaching. Lise's Ph.D. in 2003 included a thesis about high-risk groups and risk factors for low back pain in children and adolescents.

Lise is currently professor at University of Southern Denmark and senior researcher at the Nordic Institute of Chiropractic and Clinical Biomechanics. Her research focuses on two specific areas:

- Musculoskeletal health in children and adolescence
- Lifetime epidemiology of musculoskeletal pain.



care, global health, substance use, and chiropractic care.

Trynke Hoekstra works as an assistant professor at the Department of Health Sciences at the Vrije Universiteit Amsterdam where she enthusiastically teaches courses on biostatistics and epidemiology to Bachelor-, Master- and postgraduate students. Trynke obtained Masters degrees in Biomedical Sciences and Epidemiology and her PhD thesis (2013) focused on methods to study patient heterogeneity in observational and experimental research. Trynke values team science and collaboration across disciplines and is currently involved in several methodological projects, as well as projects on physical activity promotion in rehabilitation



Chiropractic is **Jan Hoeve's** second calling. After a successful scientific career in uranium geology, he moved from Saskatchewan, Canada, to the UK to be trained as a chiropractor at the Anglo-European College of Chiropractic in Bournemouth. Next, he moved back to The Netherlands, where he pursued a career in chiropractic with an interest in paediatrics. He is particularly intrigued by the causes and treatment of infantile colic, and by the interrelationships of colic and childhood/adolescent migraine.



Russ Hornstein is a Chiropractic Neurologist with 25 years of experience and a strong focus and training in vestibular rehabilitation, head and eye movement disorders and neuro orthopaedic rehabilitation. He has a great interest in spinal mechanics and a quest for the most effective tools in resolving subluxations. Over the last three years he has developed a new HVLA method called 'Adjusting to Neutral' which does not require locking out the joint at the end range yet is proving to resolve joint dysfunction precisely and quickly.



Robert Jackson became a certified Thompson Technique Instructor in 1981. He has run a private practice in Colorado since 1983 and is a post-graduate faculty instructor.



Greg Kawchuk is a full professor in the Faculty of Rehabilitation Medicine at the University of Alberta. Greg is a CMCC graduate who practiced chiropractic for 15 years in multidisciplinary settings before earning his PhD in bioengineering and becoming a full-time researcher. Greg's research interests are focused on back pain and spine function in the areas of basic science, clinical trials and implementation. Greg is one of three founder members of CARL, the Chiropractic Academy for Research Leadership, and is presently leading the new GLA:D Back initiative in Canada.



Alice Kongsted is a Professor in Musculoskeletal Research in Primary Care at the University of Southern Denmark, and a senior researcher at the Chiropractic Knowledge Hub. She has a clinical background as a chiropractor, and her research concerns spinal pain with a focus on practice-based research in primary care. In 2018, she was part of the Lancet Low Back Pain Series Working Group that published three papers to call for worldwide attention to the growing burden of back pain.



Lone Kousgaard Jørgensen has been working as a chiropractor in a growing multidisciplinary clinic for almost 20 years, with the last 10 years as owner of the clinic. From 2013 – 2021 Lone was President of the Danish Chiropractors Association. Alongside that she was a board member at the Danish Research Foundation, The Chiropractic Knowledge Hub and the ECCRE. In May 2021 Lone was elected Treasurer of the ECU.



Sven Lanser is an experienced moderator and facilitator. After graduating his Masters degree of Social Computer Science at the University of Amsterdam he worked in IT for several years, before making a 180 degree turn, diving into improv theatre, and becoming a facilitator and communications trainer. With his diverse background and natural curiosity, he is a great choice to moderate any type of discussion or debate. He is flexible, open and will make sure the audience stays engaged.



Susanne Lynge graduated 1986 from Palmer College and received an MSc. in paediatrics from AECC in 2012. She works full time as a chiropractor and is also the primary investigator and treating chiropractor on a large scale RCT investigating the effect of chiropractic on children with headache, published 2021.



Amy Miller graduated from AECC University College with a Masters in Chiropractic. She went on to complete her PhD in the Centre of Midwifery, Maternal, and Perinatal Health at Bournemouth University, alongside part-time private practice. Amy now lectures at AECC University College and remains research active, with ongoing studies into PBRN development and adolescent spinal pain. In practice, Amy's primary focus is on paediatrics, particularly infants. She sits on the EAC Special Interest Group for Paediatrics and is a Chiropractic Academy of Research Leadership (CARL) II Fellow.



Professor Dave Newell graduated from Plymouth University with a PhD in molecular biology in 1986. He holds positions of Professor of Integrated Musculoskeletal Healthcare and Director of Research at AECC University College and Visiting Research Fellow at the Faculty of Medicine, University of Southampton.

He has spent his career teaching and generating research in chiropractic institutions internationally. He has successfully supervised multiple PhD students and published extensively in areas relevant to musculoskeletal conditions in general and the chiropractic profession in particular. Recent areas of research lie in contextual factors, therapeutic alliance and the chiropractic professions role in national health systems.



Raymond Ostelo is Professor of Evidence-Based Physiotherapy at VU University and Amsterdam UMC, and program director of the MSH program (Amsterdam Movement Sciences Research Institute). Additionally he is a visiting professor at the Centre for Intelligent Musculoskeletal Health (OlosMed University).

His research centres on musculoskeletal disorders, mainly focusing on effectiveness studies. He also has a longstanding research interest in clinimetric research and has been involved in the development of various multi- and mono-disciplinary evidence-based guidelines in the field of back pain. His research has been published in leading journals such as *JAMA*, *BMJ*, *Cochrane Library*, *Spine and Pain*. Raymond is a member of the editorial board of the *Journal for Physiotherapy*.



Stephen Perle is a 1983 graduate of Texas Chiropractic College, specializing in sports chiropractic in NYC, and serving as medical director of the USA Track and Field Championships. In 1991 he joined the inaugural faculty of the University of Bridgeport School of Chiropractic. He is a Professor of Clinical Sciences teaching hands-on courses and evidence-based practice and ergonomics for engineering graduate students. Stephen just completed over 10 years of leadership positions with FICS. He is an associate editor of *Chiropractic & Manual Therapies* and is writing the 4th edition of the textbook *Chiropractic Technique: Principles and Procedures*, to be published again by Mosby Publishing.



Wilco Peul has been professor of Clinical Neurosurgery in Leiden since 2008 and Chair of a cooperative of three hospitals in Leiden and The Hague (University Neurosurgical Center Holland). Besides his particular interest in reconstructive spine surgery and neurotraumatology, he is a certified senior PhD (cum laude) Epidemiologist. With regard to spine research he is a member of the Editorial Board of the Cochrane Back Review Group and has, since 2017, been a proud and active member of the Neurotraumatology and the Spine Section of WFNS. He is member of the EANS Neurotraumatology committee and served for eight years on the Spine Committee responsible for European training in co-operation with Eurospine, until 2017. Currently he is President of the UEMS Neurosurgery section (EU, Bruxelles) on behalf of EANS. Since 2020 Wilco has been a Board member of ZonMw (The Netherlands Organisation for Health Research and Development) and started in 2021 as Editor-in-Chief of the new EANS-Eurospine journal *Brain & Spine*.



Michiel Reneman is Professor of Rehabilitation Medicine, University of Groningen, The Netherlands. He graduated as BA Physical Therapist in 1988. His subsequent career achievements include:

- MS Movement Scientist (1992).
- PhD Rehabilitation Medicine (2004).
- Main research topics: Functional Capacity Evaluation, Vocational Rehabilitation, Pain Rehabilitation.
- Research output PubMed December 2021: 206
- Advisory member Fit for Work Netherlands.
- Co-chair Pain Alliance in the Netherlands (PA!N), IASP Chapter.
- Counsellor European Pain Federation EFIC
- Member Scientific Program Committee IASP World Congress 2022 Toronto.
- Co-chair IASP Presidential Task Force – Integration ICF and ICD in Pain Medicine.

- Chair EFIC Taskforce – Definition Multimodal Pain Intervention.
- Member IASP Taskforce – Definition Interdisciplinary Pain Interventions.



Inger Roug is a doctor of chiropractic graduate of Palmer College of Chiropractic, Iowa, USA in 1989. She subsequently earned her diplomate of the American Chiropractic College of Radiology from Logan University College of Chiropractic, Missouri, USA.

Inger has lectured at three chiropractic universities in North America from 1992-2014 and is currently a chiropractic radiologist and senior lecturer at AECC-UC.

In addition to classroom teaching, Inger worked from 2003-2014 for two MR Imaging centres in the Atlanta, Georgia, USA area, where her main case loads were MRI and CT imaging of the spine and extremities.



Sidney Rubinstein is an associate professor at the VU Amsterdam, and registered epidemiologist. His research focuses on effectiveness and cost-effectiveness of interventions for MSK disorders.

The projects that Sidney conducts and supervises are strongly embedded in clinical practice, such as the PTED Trial, Warrior Trial, and IPD meta-analysis on spinal manipulative therapy (SMT). Current projects include a large, international observational study in chiropractic care (BACE-C cohort study), as well as updates of various Cochrane reviews. He is also leading a team designed to provide evidence on the effects of the manual therapies

for a WHO global guideline on LBP.

Sidney supervises PhD, MSc and BSc students, and teaches methodology of systematic reviews and meta-analyses. In addition to his academic position, Sidney works concurrently in clinical practice, and is determined to make an impact as to how chiropractors are viewed in society.



Lobke de la Ruelle graduated from WIOC in 2016 and started working in clinical practice. After obtaining the International Certificate in Sports Chiropractic (ICSC) in 2019, Lobke got involved in the chiropractic research team at the VU in Amsterdam. Her first article on management and guideline adherence is likely to be published this year.

At present, Lobke is also working on a qualitative study, investigating the perceived barriers and facilitators for chiropractic care by the elderly. Lobke will commence studying for her PhD in September, during which she will be conducting a Discrete Choice Experiment.



Arno Rutte is a former MP (seven years) and spokesperson on Curative Healthcare for the Dutch Liberal Party (VVD). He is owner of Rutte Public Affairs, a public affairs company in healthcare and life science.

Arno is a specialist in public affairs and stakeholder management in the complex field of healthcare and life science. He has a specific focus on sustainable healthcare in an aging population. In 2021, he was co-author of the book 'Value-Based Healthcare: The answer to our future healthcare challenges?'. Arno is also the host of the 'slimme zorg' (smart healthcare) podcast.



Robert Silverman is a chiropractic doctor, clinical nutritionist, national/international speaker, author of Amazon's #1 bestseller "Inside-Out Health" and founder/CEO of Westchester Integrative Health Centre. He was named ACA Sports Council's "Sports Chiropractor of the Year" in 2015, is an advisory board member of the Functional Medicine University and a seasoned health/wellness expert. Robert Silverman is a thought leader in his field and practice and is a frequently published author in peer-reviewed journals and other mainstream publications.



Stuart Smellie graduated from AECC in 1991 and has been involved in post-graduate education for most of his career. Since 2010, as Director of Academic Affairs for the Royal College of Chiropractors, he has been promoting high quality care and professional excellence, and has been the lead author of the Royal College's Quality Standards. Stuart has a track record of working with regulators and educators, seeking to raise and assure standards. He has over 30 years of experience in clinical practice, winning both personal and practice awards, and lectures on high quality evidence-based care, professional standards and clinical governance.



Gitte Tønner is a 2004 graduate from the University of Southern Denmark. She's the co-founder and current president of the Dutch-Belgian Research Institute of Chiropractic. She has had the roles of executive board member, treasurer and now president of the Netherlands' Chiropractors' Association. While maintaining close to full-time practice in a solo practice in Amsterdam, she has also been a previous ECU Convention Academic Programme Organiser (2013-2016) and is, for Utrecht, back in this capacity.



Maurits van Tulder is Professor of Health Technology Assessment at the Vrije Universiteit in Amsterdam, the Netherlands. His main research interest is effectiveness and cost-effectiveness of interventions for musculoskeletal disorders. He has ample expertise in designing, conducting and analysing randomised controlled trials, economic evaluations and systematic reviews on spinal manipulation/mobilisation amongst other interventions. He was co-editor of the Cochrane Back and Neck Group from 2006-2017 and has been chairman or committee member for at least five low back pain guidelines and several other national and international clinical guidelines.



Jan Geert Wagenaar studied as a Physiotherapist (1993) and a Chiropractor (AECC 1999 graduate) before starting a chiropractic office (2 DC's and 3 assistants) in Deventer, the Netherlands, 20 years ago. In his previous career, Jan Geert played professional soccer. In his chiropractic studying years he was the president of the AECC student Union. He later became the president of the NCA and held several positions in chiropractic related working groups before being elected as ECU vice-President. As chiropractor, he guided a team during the DAKAR rally and is currently the chiropractor of the local professional soccer team.



Rosanne Warmerdam has a master degree in Biomedical Sciences. As a scientist she set her first steps into the healthcare field. Finding out that our current healthcare system is more of a disease care system, aimed at fighting diseases and treating acute traumas instead of improving health. She is on a journey to help build a healthcare system that is focused on prevention and increasing healthy life span. She is co-founder of The Pando Network, a strategy and campaign agency for health projects. Building strategies and campaigns for (local) governments and companies to implement a new vision on health and wellbeing.



Annemarie De Zoete graduated from AECC in 1990 and in 2001 gained a Masters Degree in Epidemiology at Vrije Universiteit in Amsterdam. She has been involved with research for the last 30 years and completed her PhD in 2020. She now works part-time as a post-doctoral researcher at the Vrije Universiteit in Amsterdam, and part-time in private practice.

ACADEMIC PROGRAMME

FRIDAY 27 MAY 2022

08.30-10.00	PLE01	Opening and Keynote Lecture Chair: Gitte Tønner	Progress
08.30-09.15		ECU President's welcome: Appropriate, Accessible, Affordable care Vasileios Gkolfinopoulos NCA/DBRIC President's welcome Gitte Tønner	
09.15-10.00		Opening keynote: Live long and prosper! Rosanne Warmerdam	
10.00-10.30		Break - Posters - Exhibition	
10.30-12.00	PLE02	All about The Lancet Chair: Igor Dijkers	Progress
10.30-10.55	PLE02-01	Chiropractic or Surgery for Low Back Pain: Obsolete or Viable Options? Wilco Peul	
10.55-11.20	PLE02-02	Chiropractors taking action on Lancet messages Alice Kongsted	
11.20-11.45	PLE02-03	The Lancet Series; process, perception and impact Maurits van Tulder	
11.45-12.00		Q&A	
12.00-13.30		Lunch break - Posters - Exhibition	
13.30-15.00		Parallel sessions	
13.30-15.00	PAR01	Motivational Interviewing - Effective Communication! <i>Session will be repeated at 15.30 (PAR05)</i> Lesley Haig	Progress
13.30-15.00	PAR02	Research Presentations Chair: Luc Ailliet	Expedition
13.30-13.40	PAR02-01	The association between different outcome measures and prognostic factors in patients with neck pain Birgitte Lawaetz Myhrvold	

13.40-13.50	PAR02-02	Trajectories of pelvic girdle pain during pregnancy: Latent class growth analysis based on a weekly SMS-question Anne Marie Gausel	
13.50-14.00	PAR02-03	Agreement between retrospective visual pain trajectories and the experienced course of low back pain Casper Nim	
14.00-14.10	PAR02-04	Variation in practice profiles for clinicians managing low back pain: A prospective survey of chiropractors, physiotherapists, and general practitioners Simon Dyrlov Madsen	
14.10-14.20	PAR02-05	Are changes in pain associated with changes in HRV in subjects treated for persistent or recurrent neck pain? Galaasen Bakken	
14.20-14.30	PAR02-06	The influence of multimorbidity and co-occurring pain on LBP-related disability: secondary analyses of longitudinal data from the SELFBACK trial Cecilie K. Øverås	
14.30-14.40	PAR02-07	Clinical characteristics of patient encounters with chiropractors as First Contact Practitioners in state funded primary care in the UK Jonathan Field	
14.40-14.50	PAR02-08	Exploring visual pain trajectories in neck pain patients, using clinical course, SMS-based patterns and patient characteristics Pernille Irgens	
14.50-15.00		Q&A	
13.30-15.00	PAR03	SIG Neurology: Assessing and treating cervicogenic dizziness Assessing and treating cervicogenic dizziness Jake Cooke	Mission 1
13.30-15.00	PAR04	Erchonia workshop The latest advancements in musculoskeletal treatment therapies – focus on the shoulder Rob Silverman	Mission 2
15.00-15.30		Break - Posters - Exhibition	
15.30-17.00		Parallel sessions	
15.30-17.00	PAR05	Motivational Interviewing - Effective Communication! (REPEATED) Lesley Haig	Progress

15.30-17.00	PAR06	Research Presentations Chair: Luc Ailliet	Expedition
15.30-15.40	PAR06-01	Patient experiences of two chiropractor led MSK triage and self-care services within GP settings in the UK NHS Neil Osborne	
15.40-15.50	PAR06-02	Pressure pain thresholds in a real-world chiropractic setting – topography, changes after treatment, and clinical relevance? Casper Nim	
15.50-16.00	PAR06-03	Beliefs about back pain and associations with clinical outcomes: a primary care cohort study Søren Grøn	
16.00-16.10	PAR06-04	Self-reported attitudes, skills and use of evidence-based practice among Swiss chiropractors: a national survey Arlette Albisser	
16.10-16.20	PAR06-05	What are the perceived barriers and facilitators for chiropractic care in older adults with low back pain (LBP)? Lobke De la Ruelle	
16.20-16.30	PAR06-06	Description and classification of recurrent headaches in 7 to 14-year-old children. Baseline data from a randomized controlled trial Kristina Dissing	
16.30-16.40	PAR06-07	The utilisation of regulated standardised care packages by Danish chiropractors: A mixed methods study Rikke Krüger Jensen	
16.40-16.50	PAR06-08	Attitudes and beliefs of health professionals concerning chiropractors and the chiropractic profession: A Systematic Review Dave Newell	
16.50-17.00		Q&A	
15.30-17.00	PAR07	Long-haulers syndrome Chiropractic Strategies and Protocols for Long-Haulers Syndrome and Immune Support Rob Silverman	Mission 1
15.30-17.00	PAR08	FICS Drop Piece Lower Extremity Manipulation – Safer, Easier, Quicker for the Chiropractor Stephen Perle	Mission 2

SATURDAY 28 MAY 2022

09.00-10.30	PLE03	Peeking over the fence Chair: Luc Ailliet	Progress
09.00-09.25	PLE03-01	State of the art 2022: Spinal rehab in primary care Raymond Ostelo	
09.25-09.50	PLE03-02	Nociplastic pain mechanisms and nocebo Michiel Reneman	
09.50-10.15	PLE03-03	When content matters: Placebo and contextual factors Dave Newell	
10.15-11.00		Q&A	
10.30-11.00		Break - Posters - Exhibition	
11.00-12.30		Parallel sessions	
11.00-12.30	PAR09	SIG Clinical Axial Spondyloarthritis – Reviewing an underdiagnosed MSK condition David Byfeld Stuart Smellie Jonathan Field	Progress
11.00-12.30	PAR10	How to write a case study/series How to write a case study/series Iben Axén	Expedition
11.00-12.30	PAR11	Vestibular Dysfunction in babies Infantile colic, brainstem dysregulation (vestibular, autonomic), upper-cervical dysfunction and mild birth trauma Jan Hoeve	Mission 1
11.00-12.30	PAR12	Cervical manipulation 2.0 Cervical manipulation 2.0, adjusting to neutral Russ Hornstein	Mission 2
12.30-14.00		Lunch break - Posters - Exhibition	
14.00-15.30		Parallel sessions	
14.00-15.30	PAR13	Cervical manipulation 2.0 Vitamin D in Chiropractic practice Simon Billings	Progress

14.00-15.30	PAR14	How to become a master reader of science Interpreting the research behind our conclusions Trynke Hoekstra	Expedition
14.00-15.30	PAR15	SIG Paediatrics The Role of Physical Activity, Exercise, Sedentary Behavior and Overtraining on Growth, Development and Spinal Pain in Children Lise Hestbaek Amy Miller Aurelie Marchand	Mission 1
14.00-15.30	PAR16	Williams Health Care workshop The Thompson Technique analysis and approach to sacral complications and diagnosis Robert Jackson	Mission 2
15.30-16.00		Break - Posters - Exhibition	
16.00-17.30	PLE04	After the Global Summit - Debate Chair: Gitte Tønner Moderator: Sven Lanser Panellists: Pierre Côté, Christine Goertz, Stuart Smellie	Progress

SUNDAY 29 MAY

09.30-10.00	PLE05	Keynote Address Chair: Lone Jørgensen	Progress
09.30-10.00		Academies, The Metaverse and Social Media - building new and needed communities in chiropractic Greg Kawchuk	
10.00-11.00	PLE06	Panel Discussion: Public Health and Chiropractic Chair: Gitte Tønner	Progress
		Panellists: Richard Brown, Pierre Côté, Arno Rutte, Jan Geert Wagenaar	
11.00-11.30		Awards Vasileios Gkolfinopoulos	
		Closing speech by the ECU President Vasileios Gkolfinopoulos	
		Exhibition raffle prize drawing	
11.30-12.00		Break - Posters - Exhibition	
12.00-13.30		Parallel sessions	
12.00-13.30	PAR17	MRI Gems Sharpen your imaging skills on these common and not so common cases from chiropractic practice Inger Roug	Progress
12.00-13.30	PAR18	Ask Away! Sidney Rubinstein Annemarie de Zoete Lobke de la Ruelle	Expedition
12.00-13.30	PAR19	Evidence and clinical management of pediatric headache The effectiveness of chiropractic manipulation on children with headaches- evidence and clinical management of children aged 0-18 with headaches Susanne Lynge	Mission 1
12.00-13.30	PAR20	Lumbar manipulation 2.0 Lumbar manipulation 2.0: the role of spinal calibration in force absorption, stability and biomechanics of the lumbar spine Russ Hornstein	Mission 2

ABSTRACTS

PLENARY SESSIONS (PLE)

PLENARY SESSION 01

PLE01

Live healthy, live long(er)

Rosanne Warmerdam, HealthBlocks, Haarlem, Netherlands

During this session you're challenged to look at health from a new perspective. Rosanne will take you on a journey to find out how we can all contribute to create more health.

As a Biomedical Scientist she was trained to better understand diseases and finding cures for them. But Rosanne was more interested in health and realized that curing diseases is not (always) the same as creating health. Her life started spinning around a different question: How can we use scientific knowledge and insights to create more health?

She will talk about the latest science that shows the interaction of lifestyle and the activity of our genes and the strong connection we as humans have with bacteria in and around us. These scientific insights are just a piece of the puzzle of a much bigger picture. They are strongly related to secrets of the most healthy and happy communities around the world.

Staying healthy in this rapid changing environment can be a big challenge. Rosanne will show you that small changes can have a huge effect. There are great opportunities if we adapt a mindset in which we realize that we need to work together to create health on a broad scale. Because health is not only an individual's responsibility it's a collective responsibility and we can all use our passion, creativity and professional skills to create a little more health.

PLENARY SESSION 02

PLE02-01

The Lancet Series; process, perception and impact

Maurits Tulder, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

In 2018, a series of three papers on low back pain was published in the Lancet:

What low back pain is and why we need to pay attention.

Prevention and treatment of low back pain: evidence, challenges and promising directions.

Low back pain: a call for action.

The series was the output of long collaboration between international low back pain researchers. The approach for this series involved the constitution of a team of leading international experts on back pain from different professional backgrounds and from countries around the globe who convened for a workshop at the Low Back Pain Forum for Primary Care Research in Buxton, UK, in June 2016, to outline the structure of each paper.

The aim of the Lancet series was to present a current understanding of what low back pain is, its burden and global impact, as well as an overview of causes and the course of low back pain, to summarise the evidence for the effectiveness of current treatments and promising new directions for managing low back pain, and to initiate a worldwide call to action.

The key messages from the Lancet series are:

Use the notion of positive health—the ability to adapt and to self-manage in the face of social, physical and emotional challenges—for the treatment of non-specific low back pain.

Avoid harmful and useless treatments by adopting a framework similar to that used in drug regulation—i.e., only include treatments in public reimbursement packages if evidence shows that they are safe, effective, and cost-effective.

Address widespread misconceptions in the population and among health professionals about the causes, prognosis, and effectiveness of different treatments for low back pain.

Jointly tackle the low back pain paradox in low-income and middle-income countries, where improving social and economic conditions could prevent or reduce low back pain incidence, but at the same time create expectations and demands for medical investigations and low-value health care that increase the risk of long-term back-related disability.

After the series was published, an extensive media campaign was started to inform relevant stakeholders. The main message used in the press release was “A major challenge will be to stop the use of harmful practices while ensuring access to effective and affordable health care for people with low back pain”. This message was picked up by media in many countries and reached patient and professional associations worldwide. However, to have a real impact we need to partner with policy makers. That is the main challenge for the near future.

Foster NE, Anema JR, Cherkin D, Chou R, Cohen SP, Gross DP, Ferreira PH, Fritz JM, Koes BW, Peul W, Turner JA, Maher CG; Lancet Low Back Pain Series Working Group. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *Lancet*. 2018 Jun 9;391(10137):2368-83.

Buchbinder R, van Tulder M, Öberg B, Costa LM, Woolf A, Schoene M, Croft P; Lancet Low Back Pain Series Working Group. Low back pain: call for action. *Lancet*. 2018 Jun 9;391(10137):2384-88.

Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, Hoy D, Karppinen J, Pransky G, Sieper J, Smeets RJ, Underwood M; Lancet Low Back Pain Series Working Group. What low back pain is and why we need to pay attention. *Lancet*. 2018 Jun 9;391(10137):2356-67

PLE02-02

Chiropractors taking action on Lancet messages

Alice Kongsted, Chiropractic Knowledge Hub + University of Southern Denmark, Odense M, Denmark

The 2018 Lancet series on low back pain outlined some of the political, public health, and health-care challenges that are faced globally in relation to low back pain. The series also pointed to possible actions to take to reduce the negative impact of low back pain on people and society. From this call to action, it is clear that a new approach is needed that involves changing the narrative about back pain and shifting away from a biomedical disease model with emphasis on disease and cure to a person-centered approach with less focus on spinal abnormalities.

Among the key messages promoted by the Lancet Low Back Pain Series Working Group were to use the notion of positive health — the ability to adapt and to self-manage — for the treatment of non-specific low back pain, to avoid harmful and useless treatments, and to address widespread misconceptions about low back pain. Further, the series emphasized the need to tackle the “low back pain paradox” in low-income and middle-income countries, where there might be expectations and demands for medical investigations and low-value health care that we have realized did not do any good in high-income countries.

All these messages are relevant to chiropractors, who as a profession are involved with the management of back pain all over the world, and engage in the public education and debate about back pain.

This talk will discuss what the approach advocated by the series may look like in clinical practice, how it fits with current evidence about chiropractic care, and how chiropractors may take part in facilitating the adoption of a positive health concept.

Hartvigsen J, Hancock MJ, Kongsted A, Louw Q, Ferreira ML, Genevay S, Hoy D, Karppinen J, Pransky G, Sieper J, Smeets RJ, Underwood M; Lancet Low Back Pain Series Working Group. What low back pain is and why we need to pay attention. *Lancet*. 2018 Jun 9;391(10137):2356-2367

Foster NE, Anema JR, Cherkin D, Chou R, Cohen SP, Gross DP, Ferreira PH, Fritz JM, Koes BW, Peul W, Turner JA, Maher CG; Lancet Low Back Pain Series Working Group. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *Lancet*. 2018 Jun 9;391(10137):2368-2383.

Buchbinder R, van Tulder M, Öberg B, Costa LM, Woolf A, Schoene M, Croft P; Lancet Low Back Pain Series Working Group. Low back pain: a call for action. *Lancet*. 2018 Jun 9;391(10137):2384-2388.

PLE02-03

Chiropractic or Surgery for Low Back Pain: Obsolete or Viable Options?

Wilco Peul, LUMC, Leiden, Netherlands

Although surgery for specific low back pain (LBP) is still a very good option, the decade of the Black Disc is last century's history now. After failed non-invasive interventions it seems that the global rate of lumbar disc surgery and spine fusion shows huge practice variations, which is a sign of Low Value Care.

One of the causative problems is the diagnosis. LBP is a symptom and not an anatomical diagnosis. It seems there are different definitions of specific versus non-specific low back pain disorders, which differ per country and continent. The discussion within the special Lancet Low Back Pain focusses on aspecific causes.

What is aspecific in this sense?

Chiropractic Treatment & Surgery for LBP "suffer" from a lack of evidence and we need to discuss the consequences of our Lancet Manuscript.

PLENARY SESSION 03

PLE03-01

State of the art spinal rehab in primary care

Raymond Ostelo, VU, Amsterdam, Netherlands

In addition to chiropractic care many interventions are available for patients with low back pain. For many of these interventions systematic reviews are published. These systematic reviews are the cornerstone of evidence-based clinical practice guidelines. In this presentation the evidence from systematic reviews for frequently applied primary care treatments will be reviewed. Also, the recommendations included in various evidence-based practice guidelines will be reviewed. The similarities and differences in the recommendations will be discussed. Finally, important issues regarding the implementation of these evidence-based practice guidelines will be discussed.

What low back pain is and why we need to pay attention. Hartvigsen, et al. *The Lancet*, Vol.391, No 10137

Prevention and treatment of low back pain: evidence, challenges, and promising directions. Foster et al. *The Lancet*, Vol.391, No. 10137

Low back pain: a call for action. Buchbinder et al. *The Lancet*, Vol.391, No. 10137

Benefits and harms of spinal manipulative therapy for the treatment of chronic low back pain: systematic review and meta-analysis. Rubinstein et al. *BMJ* 2019;364:l689.

Exercise therapy for chronic low back pain. Hayden et al. *Cochrane Database Syst Rev* 2021;9

Low back pain and sciatica in over 16s: assessment and management NICE guideline [NG59] Last updated: December 2020

Aspecifieke lagerugpijn (M54). NHG-werkgroep: Bons S, Borg M, Van den Donk M, Koes B, Kuijpers, Ostelo R, Schaafstra A, Spinnewijn W, Verburg A, Verweij H

PLE03-02

Nociplastic pain mechanisms and nocebo

Michiel Reneman, UMCG, Dept. of Rehabilitation, Groningen, Netherlands

In this keynote presentation, I will address the following:

Nociplastic pain mechanisms. This is the third pain mechanism as defined by the International Association of the Study of Pain. A brief introduction into this and the other pain mechanisms, and Central Sensitization.

Central pain processing and its importance in choosing the best indicated health care intervention.

Nocebo language by health care professionals and its effects on the patient. The opposite of it, placebo, will be touched briefly, because this will be the main topic of the third speaker in this session.

PLE03-03

When content matters: Placebo and contextual factors

Dave Newell, AECC University College, Bournemouth, United Kingdom

The mechanism (s) underlying the evidenced and widespread positive outcomes associated with chiropractic care of patients in pain are presently unknown. Despite a plethora of theories ranging from unsupportable metaphysical stories to plausible neuro-biomechanical mechanisms, presently, no single explanatory framework provides a complete understanding. Entangled with the ongoing discourse as to what exactly it is that chiropractors do that drive patient improvement are issues of specificity and non-specificity of spinal manipulation and a focus on manipulation as a singular description of the professions unique selling point. Such discourse speaks to deep issues about the very nature of the profession and how it describes what it is and what it does.

In the last decade or so however, emerging evidence concerning the neurobiology of pain modulation and strong links to psychosocial cues within the therapeutic encounter have begun to illuminate how the rich complexity of patient clinician interaction can specifically and powerfully modulate pain, in particular patient-practitioner communication. Furthermore, these explanatory frameworks have uncovered neurobiological mechanisms associated with the phenomena of placebo and nocebo and are deeply linked with how human perception of the world is created.

Pain perception is the result of both bottom up and top-down signals. For example, there are situations where substantive tissue damage is painless and others where an absence of tissue damage results in ongoing and crippling pain. Notably most of the pain conditions seen by chiropractors are 'non-specific' in nature, i.e., there is no detectable tissue damage or lesion underlying the pain presentation of the patient. A recognition of these ways of understanding pain underpins the area of pain science and somewhat of a paradigm shift is underway in the way that many clinicians are explaining pain to their patients. (Butler and Mosely, 2003). A decade of research has uncovered descending pathways that modulate ascending sensory signals. The best characterised is one using endogenous opioids such as endorphins which can both increase and decrease pain perception substantively uncoupled from nociceptive input. In humans such descending mechanisms are integrated with higher centres that extract social signalling and meaning which results in the ability of psychosocial cues to directly modulate pain. The areas of psychosocial cueing are diverse; broadly associated with patient characteristics practitioners' characteristics, patient practitioner interactions including verbal communication, treatment characteristics and the therapeutic setting (Bishop et al, 2019)

This talk will attempt to briefly introduce these mechanisms, the clinical realms within which they can be harnessed and the implications for the chiropractic profession of such mechanisms as contributing to an explanatory framework for how patients get better which invokes a contextually aided recovery (CARE) paradigm (Newell et al, 2017).

Butler, D. S., & Moseley, G. L. (2003). Explain pain. Adelaide: Noigroup Publications.

Bishop FL, Coghlan B, Geraghty AWA, et al. What techniques might be used to harness placebo effects in non-malignant pain? A literature review and survey to develop a taxonomy. *BMJ Open* 2017;7:e015516.

Newell, D., Lothe, L.R. & Raven, T.J.L. Contextually Aided Recovery (CARE): a scientific theory for innate healing. *Chiropr Man Therap* 25, 6 (2017).

PLENARY SESSION 04

PLE04

After the Global Summit

Chair: Gitte Tønner. Panellists: Pierre Côté, Christine Goertz, Stuart Smellie

Day two of this year's ECU convention will finish strong with a debate between some of the most influential and sharpest minds we have in chiropractic today: Professor Pierre Côté (Ontario Tech University), Professor Christine Goertz (Duke University School of Medicine) and Stuart Smellie (Royal College of Chiropractors).

The starting point will be the Global Summit session in Toronto in 2019 and the article that came out as a result. The debaters will touch on important aspects such as how much evidence is needed to inform, add to or make policy; what is the role of science in regulation of care and how do organizations such as the Royal College of Chiropractors take the evidence and transform it into applicable guidelines?

The debate will be conducted by a professional moderator to ensure that we get around all pertinent areas. The session aims to be informative for the profession at large and encourage a healthy and constructive dialogue that hopefully will continue for some time after the convention.

PLENARY SESSION 05

PLE05

Academies, The Metaverse and Social Media - building new and needed communities in chiropractic

Greg Kawchuk, University of Alberta, Faculty of Rehabilitation Medicine, Edmonton , Canada

For more than 100 years, our efforts to grow chiropractic have focused on Regulation, Research and Recognition. While important, these efforts have left little time to develop the next "R" in the evolution of our profession - Relationships. This talk will describe how chiropractors are achieving incredible things together using new and exciting ways to create much-needed communities.

PLE06

Chiropractic and Public Health

Chair: Gitte Tønner. Panellists: Richard Brown, Pierre Côté, Arno Rutte, Jan Geert Wagenaar

This final plenary session will be very exciting and attempting to place chiropractic in a larger context. Public Health is defined as “the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society” (Acheson, 1988; WHO). Four very diverse and influential speakers will touch on Why public health is important and give us real tangible examples of how chiropractors can get involved. They will discuss how an ageing population might provide opportunities for public health engagement for chiropractors – in the Netherlands, across Europe and globally. Topics like ‘What do you hope and believe will come out of the Covid-19 crisis in terms of a focus on health and lifestyle’ will be deliberated on by renowned Canadian researcher Dr. Pierre Côté, the Secretary-General of the WFC Richard Brown, the Vice-President of the ECU Jan Geert Wagenaar and a Dutch former Member of Parliament Arno Rutte.

PARALLEL SESSIONS (PAR)

PARALLEL SESSION 01

PAR01

Motivational Interviewing: Effective Communication

Lesley Haig, AECC University College , Bournemouth, United Kingdom

Motivational interviewing (MI) is a collaborative, goal-oriented style of communication which has been widely recommended as a complex behaviour change intervention. It has its roots in the field of substance use, but has now been successfully applied in a multitude of care settings such as mental health, general practice and pain management, including spinal pain. MI builds a collaborative approach and has the added benefit for individuals and organisations of reducing worker stress and the risk of burn out.

Communication within a clinical encounter can impact patient behaviour and affect patient outcome. An area of practice where communication skills are particularly important is during encounters involving patients often described as 'difficult', who demonstrate passivity, and conversely, aggression and/or anger, and who hold unrealistic expectations about their treatment outcomes.

Clinicians, including chiropractors, have a desire to want to help the people under their care, often expressed as the 'righting reflex'. Clinicians' beliefs and aspirations for the patient determine their use of language and interventions used. When a clinician sees a discrepancy between how things are and how they ought to be they want to fix it. When patient ambivalence (conflict between two courses of action) is confronted by the righting reflex of the clinician, outcomes tend to be poor. Patients can feel unvalidated, want to resist the clinician, or withdraw from the consultation. Ultimately, people want to be understood and accepted without judgement.

MI is a highly effective approach in helping people make behavioural or attitudinal change, especially with individuals who are apparently reluctant to engage. It provides clinicians with a therapeutic strategy for enhancing patient engagement, developing a positive therapeutic relationship and evoking patients' intrinsic motivation to make positive changes through a range of measures including eliciting 'change talk'. This approach has built up a solid evidence base: it has been investigated in over 1200 randomised control trials and has superior outcomes when compared to traditional advice giving. It is also helpful in reducing worker stress.

This workshop will introduce participants to what MI is (and what it isn't), when this approach may be indicated and how it works in practice, especially in time-limited settings. Participants will be introduced to key concepts and the language of MI. They will develop knowledge about MI principles and will have the opportunity to practice some MI micro-skills which can be incorporated into their own practice.

While MI is not a panacea, this positive therapeutic approach could be a valuable tool in increasing the health of chiropractic clients as well as enhancing clinician wellbeing.

Lundahl, B., Moleni, T., Burke, B.L., Butters, R., Tollefson, D., Butler, C. and Rollnick, S. (2013) Motivational interviewing in medical care settings: A systematic review and meta-analysis of randomized controlled trials, *Patient Education and Counseling*, 93, pp. 157–168.

Miller, W.R and Rollnick, S. (2009) Ten things that motivational interviewing is not, *Behavioural and Cognitive Psychotherapy*, 37, pp. 129–140.

Miller, W.R. and Rollnick, S. (2013) *Motivational interviewing: Helping people change*. 3rd ed. New York, NY: Guilford Press

Morton, K., Beauchamp, M., Prothero, A., Joyce, L., Saunders, L., Spencer-Bowdage, S., Dancy, B. and Pedlar, C. (2015) The effectiveness of motivational interviewing for health behaviour change in primary care settings: a systematic review, *Health Psychology Review*, 9 (2), pp. 205-223.

PAR02-01

The association between different outcome measures and prognostic factors in patients with neck pain

Birgitte Lawaetz Myhrvold¹, Pernille Irgens², Nina K pke V llestad¹, Alice Kongsted³, Hilde Robinson Stendal¹

¹ Institute of Health and Society, University of Oslo, Oslo, Norway

² Institute of Health and Society, University of Oslo, Norway, Oslo, Norway

³ Department of Sports Science and Clinical Biomechanics, SDU, Odense, Denmark

Study Objectives: The objectives of this study were to examine the association among commonly used outcomes for neck pain (pain intensity, disability, and health-related quality of life) and to explore how the predictive performance of a prognostic model differs across these outcomes.

Methods and material: An observational prospective cohort study was conducted with patients with neck pain aged 18-84 years consulting Norwegian chiropractors. Three different outcomes were used: pain intensity (Numeric Pain Rating Scale), disability (the Neck Disability Index), and health-related quality of life (EQ-5D). Associations between outcome change scores at 12-weeks follow-up was assessed with Pearson correlation coefficient. Multivariable linear regression models were used to explore the differences in predictive performance in terms of explained variance between predictors and outcomes.

Results: The study sample included 1313 patients and 941 (72%) completed follow-up at 12 weeks. The strongest correlation was between disability and health-related quality of life ($r=0.57$) while the weakest correlation was between health-related quality of life and pain intensity ($r=0.24$). The correlation between disability and pain intensity was moderate ($r=0.32$). In the final regression models, the explained variance ranged from adjusted R^2 of 0.22 to 0.60, highest with disability and lowest with pain intensity as outcome. The predictive contributions of the included predictors were similar across outcomes.

Conclusion: The highest correlation in outcome change scores was found between disability and health-related quality of life. The predictive performance by the same prognostic model differed greatly across the three outcomes. Persistently, the best predictive performance was found with disability as outcome and the poorest with pain intensity as outcome. In clinical practice and in research, patients report pain intensity as most important outcome. Thus, it is necessary to further explore and develop prognostic models with the overall aim to predict pain better, or perhaps to change the conversation with patients to reflect disability as an outcome.

PAR02-02

Trajectories of pelvic girdle pain during pregnancy: Latent class growth analysis based on a weekly SMS-question

Anne Marie Gausel¹, Iben Ax n², Ingvild Dalen³, Inger  kland³

¹ Stavanger University Hospital, University of Stavanger, Stavanger, Norway

² Karolinska Institutet & ELIB, Stockholm, Sweden

³ , ,

Study Objectives: The aim of this study was to identify trajectories of pelvic girdle pain (PGP) during pregnancy based on a weekly SMS data. In addition, we sought to describe demographical and clinical variables as predictors for belonging to specific trajectory groups.

Methods and material: This was secondary analyses based on a prospective longitudinal cohort study. Women were recruited when they met for the second trimester routine ultrasound examination at the hospital, around 18 weeks of pregnancy. The women were asked to respond to a weekly SMS question throughout the pregnancy: “How many days during the past week has your pelvic pain been bothersome? (i.e. affected your daily activities or routines)”. In addition, they were asked to fill out a questionnaire with demographic and clinical information at around 18 weeks, and again at around 30 weeks of pregnancy. We included SMS responses up until pregnancy week 37 and performed latent class analysis to detect trajectories. Fractional multinomial logit models were fitted to group membership probabilities including demographic and clinical variables from before the observation period as predictors.

Results: A total of 453 women were included in the analyses. The final model detected six trajectories. Subgroup 1 (30.2%) had no PGP. Subgroups 2, 3 and 4 had persistent mild (18.0%), late onset moderate (9,1%) and persistent moderate PGP (20.7%), whereas subgroup 5 and 6 had increasing pain from moderate to severe (11.8%), and persistent severe PGP (10.2%). We found age, body mass index (BMI) and pelvic pain before pregnancy to be predictors of group membership.

Conclusion: This is the first study, to the authors` knowledge, to use weekly SMS data and latent class analyses for detecting trajectories of PGP during pregnancy. We identified six distinct trajectories of PGP and found predictors for group membership. This improves the understanding of the course of PGP during pregnancy and can be used to improve decisions for interventions. However, future studies should include weekly data from first trimester throughout the pregnancy until birth.

PAR02-03

Agreement between retrospective visual pain trajectories and the experienced course of low back pain

Casper Nim¹, Vach Werner², Aron Downie³, Alice Kongsted⁴

¹ Spine Centre of Southern Denmark, University Hospital of Southern Denmark, Middelfart, Denmark

² Basel Academy for Quality and Research in Medicine, Basel, Switzerland

³ Department of Chiropractic, Faculty of Medicine, Macquarie University, Sydney, Australia

⁴ Department of Sports Science and Clinical Biomechanics, SDU, Odense, Denmark

Study Objectives: Distinct low back pain (LBP) trajectories are identifiable from prospectively captured repeated measures. However, in a clinical setting, care providers rely upon historical pain patterns to help understand the condition and predict the future course. This study investigates to what degree patients' recall of historical patterns describes the prospectively experienced course of LBP.

Methods and material: We obtained data from 719 Danish chiropractic patients seeking care for LBP. Participants scored their pain intensity (0-10) weekly for 52-weeks through SMS. At the end of that period, participants identified a visual pain trajectory (VPT) from seven distinct options that best matched their pain course during the previous year. Within each VPT, we present the following SMS-captured data: i) number of weeks with pain, ii) average pain intensity across all weeks and in weeks with pain only, and iii) the number of pain-free episodes (min. four weeks without pain in a row bounded by weeks with pain).

Results: The results for each VPT identified are presented as means (10th - 90th percentile) and the most frequent number of pain-free episodes:

VPT Single episode/recovered: 240 participants (33%) reported pain for 7 (1 – 15) weeks. The mean pain intensity was 0.4 (0.0 – 1.0), and in weeks with pain 3.4 (1.5 - 5.6). 44% reported one pain-free episode.

VPT Episodic: 87 participants (12%) reported pain for 13 (2 – 33) weeks. The mean pain intensity was 1.0 (0.1 – 2.4), and in weeks with pain 3.5 (1.8 - 5.1). 38% reported two pain-free episodes.

VPT Fluctuating minor: 119 participants (17%) reported pain for 26 (8 – 42) weeks. The mean pain intensity was 1.9 (0.4 – 3.5), and in weeks with pain 3.1 (2.0 - 4.2). 48% reported no pain-free episodes.

VPT Stable minor: 44 participants (6%) reported pain for 18 (2 – 41) weeks. The mean pain intensity was 1.4 (0.4 – 3.5), and in weeks with pain 3.4 (1.5 - 5.1). 36% reported no pain-free episodes.

VPT Fluctuating intermediate: 112 participants (16%) reported pain for 32 (10 – 42) weeks. The mean pain intensity was 3.5 (0.9 – 5.6), and in weeks with pain 4.4 (2.9 - 6.0). 69% reported no pain-free episodes.

VPT Fluctuating severe: 32 participants (4%) reported pain for 35 (23 – 42) weeks. The mean pain intensity was 4.6 (2.4 – 7.1), and in weeks with pain 5.3 (3.9 - 7.2). 75% reported no pain-free episodes.

VPT Stable severe: 7 participants reported a mean of 33 weeks with pain (3 reported pain all weeks). The mean pain intensity was 5.0 (2.5 – 6.7) and for weeks in pain 5.9 (4.9 - 6.8). Two participants reported one pain-free episode.

78 (11%) of participants could not recognize any specific VPT.

Conclusion: Visual pain trajectory classes can provide care providers with valuable information about the likely experienced course of LBP. However, the experienced course varied amongst patients who identified the same VPT. Reasons for apparent mismatches between SMS trajectories and VPTs recall, warrant further investigation.

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PAR02-04

Variation in practice profiles for clinicians managing low back pain: A prospective survey of chiropractors, physiotherapists, and general practitioners

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Study Objectives: Patients with low back pain (LBP) seek care from different primary care clinicians, but little is known about the actual care delivered. Our objectives were to investigate (1) the frequency of clinical actions by chiropractors (DCs), physiotherapists (PTs), and general practitioners (GPs) when managing patients with LBP, and (2) if distinct intra-professional clinician profiles with similar frequencies of clinical actions could be identified using Latent Class Analysis (LCA).

Methods: All DCs, PTs and GPs in the Region of Southern Denmark were invited to participate in a prospective survey of LBP management. Over a two to four week period, clinicians registered all patient visits regarding LBP, registering patient and consultation characteristics, and clinicians' own clinical actions in a validated survey containing guideline endorsed and/or commonly used clinical actions: i.e., information about LBP and its' prognosis, advice to self-management, manual therapy, exercise instructions, referrals, and profession-specific actions (e.g., GPs' prescriptions of pain medication). Further, clinicians completed a survey on their own demographics and work-related

characteristics. To investigate recently initiated treatment courses, we limited the analysis to only include 1st to 6th time visits. The clinical actions were analysed using descriptive statistics presented as frequencies on profession level, and median, interquartile range and standard deviations on clinician level. To identify intra-professional clinician profiles in DCs and PTs, LCA was conducted for the most frequent actions using random predictions for start values (5 draws).

Results: In all, 43 DCs, 67 PTs, 33 GPs collected data on 3,511 LBP visits. The most frequent clinical actions included giving advice (DCs (66%), PTs (81%), GPs (56%)) and information (DCs (49%), PTs (56%), GPs (42%)). Further, DCs provided manual therapy in almost every visit (96%) and exercise instructions in 45%; PTs instructed in exercises in 81% of visits, and provided manual therapy in 65%, while GPs prescribed pain medication in 40% of visits, and referred to PTs in 36%. For several actions (e.g., giving information), we observed large variation intra-professionally, ranging between use in (almost) none to all the registered visits. Within both DCs and PTs, three distinct clinician profiles with similar frequency of clinical actions were identified. All the profiles differed regarding the frequency of giving information and advice. Further, DCs' profiles differed in the frequency of offering exercise instructions (frequency of exercise instructions increased when observed with higher frequency of providing information and advice), while PTs' profiles were different in provision of exercises and manual therapy. GPs provided insufficient data to conduct the LCA.

Conclusion: Across the three professions, LBP management varies widely even intra-professionally. Guideline endorsed actions varied between clinicians of the same profession from being provided in none to all the registered visits. The observed diversity of management profiles highlights the challenges of implementing clinical practice guidelines to clinicians. Qualitative enquiries may elucidate how and why clinicians choose specific management approaches.

PAR02-05

Are changes in pain associated with changes in HRV in subjects treated for persistent or recurrent neck pain?

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Study Objectives: Persistent or recurrent neck pain is, similar other chronic pain conditions, associated with autonomic dysregulation i.e. reduced parasympathetic activity and increased sympathetic activity. Autonomic nervous system regulation has been shown to worsen with nociceptive stimulation, and persistent neck pain has been found to improve with breathing exercises aimed to normalize the autonomic nervous system.

Therefore, we investigated if changes of pain concurred with changes in autonomic nervous system regulation, measured as heart rate variability, in a cohort of subjects treated for persistent or recurrent neck pain over two weeks.

Methods and material: This was an exploratory analysis based on data from a randomized controlled trial carried out in five multidisciplinary primary care clinics in Stockholm. In the trial, subjects with a history of persistent or recurrent neck pain in the previous six months were given home stretching exercises with or without spinal manipulative therapy for two weeks. As the effects of the interventions were found to be equal, all the 131 subjects were studied as one cohort in this analysis. During the two-week intervention, pain intensity (NRS-11) was measured with daily text messages and heart rate variability with RMSSD (Root mean square of successive RR interval differences) as the main outcome was measured three times. Two strategies were utilized to investigate the association

between the two variables. Changes in pain were classified as either "improved" (2 points or more on the NRS-11 scale) or "not improved" (no change or less on the NRS-11 scale) after the two-week intervention period.

Four pain trajectories were constructed in a data driven approach.

Changes in pain using both strategies (1 and 2) were compared to changes in heart rate variability over two weeks with the assumption that they would concur.

A mixed linear regression model with a person-specific random intercept and a group-time interaction with repeated measurements using all available time points was used.

Results:

1: Improved/non-improved: Heart rate variability did not differ significantly between the improved and non-improved subjects.

2: Pain trajectories: There was no significant difference in change in heart rate variability over time between the four trajectories.

Conclusion: Changes in pain during an intervention with SMT and/or home stretching exercises over two weeks was not significantly associated with changes in autonomic nervous system regulation for this study population with persistent or recurrent neck pain.

The results question whether the use of heart rate variability as an outcome measure is clinically valuable.

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PAR02-06

The influence of multimorbidity and co-occurring pain on LBP-related disability: secondary analyses of longitudinal data from the SELFBACK trial

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² , ,

Study Objectives: selfBACK, an artificial-intelligence (AI)-based app, has been shown to reduce back-related disability. Since low back pain commonly co-occurs with multimorbidity (≥ 2 long term conditions [LTCs]) or pain at other musculoskeletal (MSK) sites, this study investigates whether these elements modify the effect of the selfBACK app's or influences outcome trajectories.

Methods and material: Secondary analysis of a randomised controlled trial (n=461) with nine-months follow-up. The selfBACK trial was conducted in Trondheim, Norway, and Odense, Denmark. Participants were recruited in primary care by physiotherapists, chiropractors, general practitioners and from an outpatient spine clinic. Primary outcome was LBP-related disability (Roland Morris Disability Questionnaire, RMDQ). Secondary outcomes were stress, depression, illness perception, self-efficacy, general health, quality of life, physical activity, and global perceived effect. Linear mixed models were used for continuous outcomes and logistic generalized estimating equation models for binomial outcomes. Analyses were stratified by multimorbidity status or number of co-occurring MSK

pain sites to assess effect modification, whereas control (n=229) and intervention (n=232) groups were pooled according to number of LTCs and MSK pain sites in analyses of outcome trajectories.

Results: There was no interaction between the effect of the selfBACK app and multimorbidity or co-occurring musculoskeletal pain on any outcomes. The effect was slightly greater in participants with multimorbidity than among those with LBP only (difference in RMDQ due to interaction, -0.9 [95 % CI -2.5 to 0.6]), however, the precision of the estimates was low. People with larger number of LTCs and more co-occurring MSK pain had higher levels of baseline disability, along with higher baseline scores for stress, depression, illness perception and poorer pain self-efficacy and general health ratings. In the pooled sample, LBP-related disability improved less over time for people with ≥ 2 LTCs additional to LBP or ≥ 4 co-occurring MSK pain sites compared to no multimorbidity and ≤ 1 additional MSK pain site (difference in mean change at 9 months = 1.5 and 2.2, respectively). For secondary outcomes, there were minor improvements over time for all groups.

Conclusion: Co-existence of multimorbidity or co-occurring MSK pain with LBP does not modify the effect of the selfBACK app even though people with these problems had greater pain-related disability at baseline. This suggests that personalised AI-based apps for self-management of LBP can be considered additionally to usual care also for those with multimorbidity or co-occurring MSK pain. Participants with these health problems gradually improved in LBP-related disability over time, but less so for those most affected.

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PAR02-07

Clinical characteristics of patient encounters with chiropractors as First Contact Practitioners in state funded primary care in the UK

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³ , ,

Study Objectives: In the UK health policy has shifted to increasing use of non-medical specialists as First Contact Practitioners (FCP) within primary care with a view to reduce the burden on general practitioners and providing more rapid access to specialist care for patients. In these roles chiropractors were not providing a course of care; rather assessment, advice, possibly one or two sessions of manual therapy and where appropriate referral. This study sought to describe the clinical characteristics of patient encounters of chiropractors in First Contact Practitioner roles within two state funded primary care clinic groups in England.

Methods and material: Retrospective data was extracted manually from electronic health records relating to clinical encounters with FCP chiropractors in two General Practitioner (GP) practice groups between April 2019 and March 2020.

Results: Data on 1043 appointments from electronic records were assessed with a mean age 60.5 (Female=63.2%). There were 994 completed clinical encounters (6.15 % did not attend and 3.3% canceled). Lower back pain was the most common reason for attending (23.3%) followed by shoulder problems (10.9%), knee (9.5%), hip (8.3%) and neck (7.8%) with 11.1% having multiple areas of complaint. The majority (61.9%) had not sought help with the presenting complaint before. 88.2% of assessed records had evidence of screening for red flags. Diagnostic testing was requested in 16.8% of cases (Blood tests 12.4%, Ultrasound 2.5%, X-ray 2.2%). Although chiropractors were unable to prescribe directly, they requested new medication or medication increases in 15.6% of cases and reductions in 12.1%. Self-help advice including exercise was frequently provided (75.2%) as was general lifestyle / healthy living advice (62.2%). Referral to community or hospital services were made

following 14.9% of appointments. 19.2% had a follow-on visit over the next six months for the same condition.

Conclusion: This study analysed two of only very few instances of chiropractic care delivery within GP practices in England. For just over half of patients the chiropractor was the first health care professional seen with the presenting condition.

Spinal and large joint area symptoms were the most common presentations and in line with guidelines, diagnostic testing was infrequent and self-help advice / exercises were common with medication reduction recommended about as often as new medication/dose increase. For FCP chiropractors, less than 20% of patients re-presented over the following six months with the same condition indicating Chiropractors working in FCP roles in primary care settings achieve the goal reduced the burden on the practices.

PAR02-08

Exploring visual pain trajectories in neck pain patients, using clinical course, SMS-based patterns and patient characteristics

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Study Objectives: The dynamic nature of neck pain has so far been identified through longitudinal studies with frequent measures. We have found that standardized definitions for clinical course patterns developed for low back pain were readily applicable to a neck pain cohort, and with similar distribution into the defined patterns. Additionally, we found an overall stability of the persistent pattern over time, while patients with episodic pattern had more potential for shifts between patterns. However, collecting data weekly over one year can be time-consuming, expensive, and impractical. Pictures illustrating different courses of pain may be an alternative solution, and can be usable in both clinical work and research. However, it is unknown how well they capture the real clinical course. The aim of this study was to explore and describe self-reported visual trajectories in terms of patients' prospectively reported clinical course and SMS-based classification of neck pain.

Methods and material: Prospective cohort study including 888 neck pain patients from chiropractic practice in Norway, responding to weekly SMS-questions about pain intensity for 1 year. The data were used to classify patients into one of three clinical course patterns based on the following previously published descriptors: Persistent fluctuating, Episodic, and Recovery. At 1-year follow-up, patients selected a visual trajectory that best represented their retrospective 1-year course of pain: Single episode, Episodic, Mild ongoing, Fluctuating and Severe ongoing. We described the visual trajectories based on descriptors of the patients' prospectively reported pain over the 1-year follow-up, as well as their pattern classification at 1 year.

Results: Episodic and Fluctuating visual trajectories were selected by 37% and 36% of patients, respectively. In general, the visual trajectories resembled the clinical course characteristics on group level. Patients selecting Single episode visual trajectory (14%) were likely to report very little pain, were negligibly affected by their pain, but very few patients were classified with only one single episode of pain. Patients selecting the Fluctuating visual trajectory had minimal numbers of pain-free weeks, large pain variation, and reported moderate- to high pain. The majority of them (80%) were classified in a persistent fluctuating pattern. Patients selecting Episodic and Mild ongoing visual trajectories were similar on most parameters. However, there were large individual variations within each visual trajectory. In general, the visual trajectories best resembled the clinical course of the last quarter for all patients except those classified as Episodic.

Conclusion: The selected visual trajectories reflected the descriptors of the clinical course of pain based on weekly SMS' on group levels. However, large variations were found in symptoms and characteristics within, as well as overlap between, each visual trajectory. In particular, patients with mild pain seemed predisposed to recall bias. Although the visual trajectories and SMS-based

classifications appear related, the selection of visual trajectory seems to be related to more than just the course of pain. Hence, based on our results, we do not see these visual trajectories as a proxy for SMS-tracking of pain over 1 year.

PARALLEL SESSION 03

PAR03

Assessing and treating cervicogenic dizziness

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Dizziness is common in general practice but diagnosis can be challenging, especially when the patient's description of their symptoms can be vague. Cervicogenic dizziness (CGD) is relatively uncommon compared to BPPV, vestibular migraine and other causes of dizziness. Therefore, it requires a high level of skill to be sure of an accurate diagnosis. Understanding the presentation of CGD is the key to treatment.

This workshop will describe the signs, symptoms and assessment of CGD. We'll be discussing the treatment strategies that are effective for this condition but also useful in the treatment of more common causes of dizziness.

PARALLEL SESSION 04

PAR04

The Latest Advancements in Musculoskeletal Treatment Therapies – Focus on the Shoulder

Robert Silverman, Dr. Robert Silverman, White Plains, United States

In this new insightful 90-minute presentation, Dr. Robert Silverman will lead you through the latest developments in a comprehensive approach to treatment. Based on the plethora of quality new research, you will learn the value of laser therapy as a stand-alone modality or a synergistic treatment that fits perfectly into your chiropractic armamentarium. In his dynamic presentation, Dr. Silverman presents integrative approaches to performance nutrition, essential supplementation, functional assessments, and other new protocols that will help you attain superior clinical outcomes.

Also included is Dr. Silverman's new paradigm for neurodynamic testing, along with extensive hands-on demonstrations, highlighted by his patented method for vagus nerve stimulation. This seminar explores how systems interact, including the bidirectional gut-brain axis. You will learn practical applications for musculoskeletal treatments with a focus on the shoulder.

Join Dr. Silverman in this illuminating seminar and gain insight into a comprehensive methodology that incorporates proven protocols into a clinically integrated system—one you can apply to your practice immediately.

Key clinical takeaways:

Learn hands-on reproducible, implementable protocols for Monday-morning application

Implement neurodynamic tests and corrective laser protocols

Assess and understand traumatic brain injuries (concussion, neurodegenerative diseases), know what to recognize and when to refer
Incorporate clinical breakthroughs in the treatment of musculoskeletal injuries
Demonstrations of laser applications and case studies

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PARALLEL SESSION 05

PAR05

Motivational Interviewing: Effective Communication (Repeated)

Lesley Haig, AECC University College , Bournemouth, United Kingdom

This is a repeated workshop. Abstract see PAR01 – page 32.

PARALLEL SESSION 06

PAR06-01

Patient experiences of two chiropractor led MSK triage and self-care services within GP settings in the UK NHS

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² , ,

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Study Objectives: With rising demand and ever-increasing GP workload in the UK, the NHS is making use of allied health professionals - such as nurse practitioners, pharmacists, paramedics, and physiotherapists - within primary care to ease GP workload, reduce specialist referrals, and improve waiting times and quality of service for patients. This study combines two service evaluations which look at the utilization of chiropractors in this context as First Contact Practitioners (FCP) within two state funded primary care clinic groups in Hampshire, England (Service Evaluation 1) and six GP surgeries in Dorset, England (Service Evaluation 2).

Methods and material: Service Evaluation 1: Between April 2019 and March 2020 a link to an online survey was sent by SMS to an estimated 500 patients who had attended the chiropractor led FCP service to evaluate their satisfaction.

Service Evaluation 2: In 2019 postal questionnaires were sent to 250 consecutive patients to establish whether it was acceptable to see a Chiropractor instead of their GP for an MSK presentation. A further 350 consecutive patients were asked to complete a satisfaction survey upon leaving their FCP encounter along with 30 GPs in the surgeries, whose opinion was also sought.

Results: Service Evaluation 1: 162 responses were received for the satisfaction survey (F=65%) with most (77%) being happy to have seen a chiropractor rather than medical doctor and the large majority feeling they were well listened to (87.7%), thoroughly examined (84.1%) and had their condition explained well (80.4%).

Service Evaluation 2: Of the 186 respondents (F=74.4%), 98% agreed that it was acceptable to see the chiropractor instead of their GP for their MSK condition on that day, and again 98% of those were 'very happy' or 'happy' with the advice given.

Of the 350 satisfaction surveys, an overall satisfaction score in all areas of ~4.8 on a 5-point Likert scale was recorded. 11 of 30 GPs also asked about the service and a similar 4.8 satisfaction score was established.

Conclusion: Both service evaluations found that a significant majority of patients were satisfied or very satisfied to be seen by a chiropractor, rather than a medical doctor for their condition on that day, and felt that their assessment and explanation was appropriate, with the vast majority being 'satisfied' or 'very satisfied' with the service and advice given. These data suggest that using chiropractors to help support the NHS would be received in a very positive manner and would represent the introduction of a hitherto untapped workforce thus helping ease GP workloads.

Physiotherapist as an alternative to a GP for musculoskeletal conditions: a 2-year service evaluation of UK primary care data *320 British Journal of General Practice*, May 2019

Physiotherapy-as-first-point-of-contact-service for patients with musculoskeletal complaints: understanding the challenges of implementation. *Primary Health Care Research & Development* 2018; 19: 121–130

Exploring what patients with musculoskeletal conditions want from first point-of-contact health practitioners Jo Erwin, et al., *Rheumatology Advances in Practice* 2020;0:1–7

PAR06-02

Pressure pain thresholds in a real-world chiropractic setting – topography, changes after treatment, and clinical relevance?

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Study Objectives: Changes in pain sensitivity, as indicated by pressure pain thresholds (PPT), are a commonly suggested mechanism for the pain relief often experienced following spinal manipulative therapy (SMT). While there is agreement that PPT increases systemically, and more so at the SMT site, the research has primarily been conducted in highly experimental setups and often using an asymptomatic population. The clinical relevance of PPT changes following SMT is unclear, as many important factors differ between experimental and clinical setups. Therefore, we investigated PPT before and after chiropractic care in a clinical setting (in which we expected patients to receive SMT) and investigated relationships with various potentially clinically-relevant factors.

Methods and material: We recruited participants from four Danish chiropractic practices between May and August of 2021. A total of 129 participants (72% of the invited) were included. We measured PPT at eight pre-determined test sites (six spinal and two extra-spinal) immediately before the chiropractic consultation (*pre-session*) and immediately after (*post-session*). We used linear regression

approaches to investigate the PPT changes in relation to the following factors: i) segmental distance to the nearest SMT site, ii) rapid clinical response, and iii) number of SMTs performed.

Results: All participants received one or more SMT treatments (range 1 to 12) as we expected. The mean before/after PPT change was 0.14 Kg (95% confidence intervals = -0.01 to 0.29). No significant associations were found in relation to distance between the PPT test site and nearest SMT site, the clinical response of participants to treatment, or the total number of SMTs performed.

Conclusion: This real-world trial of private practice chiropractic patients receiving SMT failed to demonstrate a substantial systemic increase in PPT following the clinical encounter. None of our selected a-priori factors were correlated with PPT changes. This is not in line with previous publications and questions the generalizability of using highly experimental setups to determine the neurophysiological mechanism of SMT in a clinical setting.

Honoré M, Leboeuf-Yde C, Gagey O. The regional effect of spinal manipulation on the pressure pain threshold in asymptomatic subjects: A systematic literature review. *Chiropractic & Manual Therapies*. 2018 Dec;26.

Aspinall SL, Leboeuf-Yde C, Etherington SJ, Walker BF. Manipulation-induced hypoalgesia in musculoskeletal pain populations: A systematic critical review and meta-analysis. *Chiropractic & Manual Therapies*. 2019 Jan;27.

Nim CG, Kawchuk GN, Schjøttz-Christensen B, O'Neill S. The effect on clinical outcomes when targeting spinal manipulation at stiffness or pain sensitivity: A randomized trial. *Scientific Reports*. 2020 Dec;10

PAR06-03

Beliefs about back pain and associations with clinical outcomes: a primary care cohort study

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Objectives: Beliefs about low back pain (LBP) are considered important contributors to both pain perception and disability. However, the association has mostly been investigated at a cross-sectional level and longitudinal studies are lacking. The objective of this study was therefore to investigate associations between beliefs about LBP at baseline and pain intensity and disability at the 2-, 13- and 52-week follow-ups in patients with LBP, and whether the association differed according to pain duration. Also, we assessed if specific beliefs had a stronger association with pain intensity and disability at the 13-week follow-up compared to the other beliefs investigated.

Methods: We conducted an observational cohort study using data from the Danish Chiropractic Cohort. To be enrolled a patient needed to consult a private chiropractor for a new onset of LBP with or without leg pain, for which the patient was not currently receiving treatment or long-term management. Follow-up data were available from 71%, 61% and 52% of the participants at 2, 13 and 52 weeks, respectively. Beliefs about LBP were measured by the Back Belief Questionnaire (BBQ) before consulting the chiropractor. Pain intensity was measured on a Numerical Rating Scale and disability by the Roland Morris Disability Questionnaire at baseline and at each follow-up. Associations were explored using longitudinal linear mixed models estimating interactions between BBQ and time.

Results: More positive beliefs about LBP were weakly associated with an additional reduction in pain at 2 weeks (interaction BBQ#Time $\beta = -0.01$ (95% CI -0.03; -0.004)), at 13 weeks $\beta = -0.03$ (95% CI -0.04; -0.01), and at 52 weeks follow-up, $\beta = -0.03$ (95% CI -0.05; -0.01) ($p=0.005$). For disability, the association was uncertain ($p=0.81$). The associations were not substantially different between groups with different LBP duration. The item “*Back trouble means periods of pain for the rest of one’s life*” had the strongest association with both reduction in pain ($\beta = -0.29$, 95% CI -0.4; -0.19, $p<0.001$) and disability ($\beta = -2.42$, 95% CI -3.52; -1.33, $p<0.001$) at 13 weeks follow-up.

Conclusion: Positive beliefs regarding LBP at baseline, measured by the BBQ, was weakly associated with a reduction in LBP intensity but not disability at the 2-, 13- and 52-week follow-ups in people with LBP seeking chiropractic care. Whether the association with LBP intensity was clinically relevant is questionable. The BBQ is therefore not promising for predicting or explaining the course of LBP in this

setting. Future research should focus on exploring the associations between beliefs and clinical outcomes in different patient populations and with instruments covering all pain belief domains or more unambiguously covering a single domain. Furthermore, the longitudinal relationship between beliefs and levels of pain and disability should be investigated at an individual level.

PAR06-04

Self-reported attitudes, skills and use of evidence-based practice among Swiss chiropractors: a national survey

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Study Objectives: The high burden of disease associated with musculoskeletal disorders severely impact patients' well-being. As primary care providers in this field, Swiss chiropractors ought to contribute towards identifying and developing effective treatment strategies. An established approach in the medical community is the full integration of evidence-based practice (EBP), a concept also promoted by the World Federation of Chiropractic. Several studies conducted in different countries have analysed how chiropractors include research evidence in their clinical practice. A comparable investigation focusing on Swiss chiropractors is missing. Our primary objective was to investigate the attitudes, skills and use of EBP among Swiss chiropractors, as well as investigating potential facilitators and barriers in its adoption. Findings may help shape the education in Switzerland and further promote the integration of EBP into clinical practice.

Methods and material: All 329 members of the ChiroSuisse Association were invited in March 2021 to participate in this cross-sectional survey. Data was acquired anonymously online, using the self-administered validated EBASE survey. The questionnaire encompassed 55 questions measuring participants attitudes (n=8, response range 1-5; total score range of 8-40), skills (n=13, response range 1-5; total score range of range of 13-65) and use of EBP (n=6, response range 0-4; total score range of 0-24). We used descriptive statistics for each item. The attitudes, skills, and use sub-scores were calculated using the scoring rubric developed for the original EBASE.

Results: 228 (69.3%) chiropractors completed the entire questionnaire. This sample was representative of all ChiroSuisse members. Most participants had been working for more than 16 years (65.4%) and a significant number (>40%) had obtained an additional higher education aside from chiropractic (BSC 14.6%, MSC 19.7%, PhD 0.9%, postgraduate degree 6.1%, other 2.6%). Respondents generally held a positive attitude towards EBP, as indicated by the high mean (31.18) and median (31) attitude sub-score (range 11-40). Self-reported skills had a mean sub-score of 40.2 and median of 40 (range 13-65). In particular, the participants were confident in their ability to identify knowledge gaps and answerable clinical questions. Knowledge about EBP-based clinical practice had been primarily obtained in chiropractic under- (33.8%) or postgraduate (26.3%) education. Use of EBP achieved a lower sub-score, with mean and median values of 7.4 and 6, respectively (range 0-24). Nevertheless, 56.1% of the participants claimed that at least half of their practice is based on clinical research evidence. The use of professional literature related to the practice was reported most often (93%), although the reading reportedly did not influence clinical practice for 36.8% of the participants. The most commonly identified barriers preventing EBP uptake were lack of time (67.9%) and lack of clinical evidence in chiropractic/manual therapy-related health fields (45.1%).

Conclusion: Swiss chiropractors held favourable attitudes and reported moderate to moderate-high skill levels in EBP. Nevertheless, similar to chiropractors in other countries, the self-reported use of EBP is still relatively low, with lack of time and lack of clinical evidence being the most named barriers.

These findings suggest that future studies investigating methods to improve the EBP uptake are justified.

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Leach MJ, Gillham D. Evaluation of the Evidence-Based practice Attitude and utilization Survey for complementary and alternative medicine practitioners. *J Eval Clin Pract.* 2008;14(5):792-8.

Leach MJ, Gillham D. Are complementary medicine practitioners implementing evidence based practice? *Complement Ther Med.* 2011;19(3):128-36.

Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ.* 1996;312(7023):71-2.

Bussi eres AE, Terhorst L, Leach M, Stuber K, Evans R, Schneider MJ. Self-reported attitudes, skills and use of evidence-based practice among Canadian doctors of chiropractic: a national survey. *J Can Chiropr Assoc.* 2015;59(4):332-48.

PAR06-05

What are the perceived barriers and facilitators for chiropractic care in older adults with low back pain (LBP)?

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Study Objectives: Low back pain (LBP) is a pandemic which has a disproportional effect on older adults. One effective form of care for LBP is chiropractic. However, as with many interventions, much is known about the effect of treatment in those between 18 and 65 years of age, but relatively less in those older than 65. Given that older adults may experience treatment different than their younger counterparts, it is vital to examine this patient population in more detail. As chiropractic in the Netherlands is a small and not well-known profession, elderly patients may not consider chiropractic care as an option for the treatment of their LBP. One recent qualitative study examined barriers and facilitators, but that paper focused on manual therapy and neck pain; therefore, these remain unclear for older adults seeking chiropractic care for LBP. The objective is to evaluate the perceived barriers and facilitators which influence care seeking behaviour in older patients with LBP with respect to chiropractic care.

Methods and material: Stage 1: Participants 56 years of age and older with chronic LBP who either sought or did not seek chiropractic care were interviewed to provide detailed information on the variables that stimulate or impede care seeking behaviour. Data was collected until saturation was reached, meaning no new themes were identified. Participants were recruited through the network of researchers, fellow chiropractors and colleagues of other healthcare professions. Those with underlying pathology, previous surgery for LBP, or insufficient mastery of the Dutch language were excluded. Purposive sampling was used.

Stage 2 (in preparation): A focus group will be held, with the purpose of testing the themes identified in the first stage, with the potential that new themes are identified.

All interviews were held online, voice recorded and transcribed verbatim.

The barriers and facilitators identified in Stage 1 were synthesized in an iterative process with the help of a thematic analysis.

Results: In general, participants indicated that they had not sought chiropractic care previously because they either were not aware of this form of care or their LBP was treated satisfactorily by another professional. The majority of the patients seeking care from a chiropractor were referred by

a trusted person. The main reason why elderly with LBP seek chiropractic care was previous treatment had not (sufficiently) resolved their LBP. Additionally, insurance coverage appears to be a barrier. That is, while the majority indicated they were willing to pay part of the cost of care, participants indicated they would be apprehensive to start treatment if the insurance coverage was lacking.

Conclusion: The lack of knowledge about chiropractic care was found to be the most important barrier to seeking care. And the most important facilitator was insufficient resolution of their symptoms with care elsewhere. This new information should influence future implementation strategies in order to optimize treatment for older adults seeking care by a chiropractor for LBP.

PAR06-06

Description and classification of recurrent headaches in 7 to 14-year-old children. Baseline data from a randomized controlled trial

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Objectives: Headache in children is common, often recurring, and may impact many aspects of childhood life. This emphasizes the need for early identification and proper management to reduce the risk of headaches persisting into adulthood.

To improve our knowledge about children with recurrent headaches we describe a population sampled for a randomized controlled trial (RCT) investigating the effectiveness of chiropractic spinal manipulation in children aged 7-14 with recurrent headaches.

The three objectives of this study are:

- 1) to describe headache characteristics and characteristics of children with recurrent headaches
- 2) to investigate associations between headache- and child characteristics and the headache type
- 3) to explore whether data supports the headache classification, as defined by The International Headache Society, in this population.

Method: Data were collected from November 2015 to August 2019 at a chiropractic clinic and a pediatric medical clinic in Denmark.

Data for this study were based on a baseline questionnaire and clinical data from a physical screening. The available data does not cover the ICHD criteria entirely, so the classification was slightly modified. Children not fulfilling the criteria for migraine or tension-type-headache were regarded as having "non-classifiable headache".

The correlation between severity and symptoms indicators related to the migraine versus tension type distinction was investigated in order to define a continuous migraine-tension-type-index in this population.

Results: The baseline cohort consisted of 253 children, 44% boys and a median age of 11. The mean pain intensity was 5.9 measured on a numerical rating scale. More than 2/3 of the children had been suffering from headache for >1 year, and more than half of them for several days a week. More than 1/3 of the children used non-prescriptive medicine ≥ 1 days a week. Half of the children were non-classifiable, 22% were categorized with migraine and 23% with tension-type headache. The differences between tension-type headaches and migraine headaches were most pronounced with respect to co-occurring symptoms and aggravation by sports, both predominantly associated with migraine. Severity indicators and symptoms showed the expected correlation and allowed us to define a migraine-tension-type-index as a summary score based on severity and symptoms. The index describes a continuous spectrum and not just two distinct groups, but probably with migraine in the high end of

the index and tension-type headache in the low end. Such an index could be advantageous as it allows for combination of headaches with co-occurring symptoms, which are often seen in children. The non-classifiable group, including children with low or high index values, does not represent mixed headaches only, but may represent other diagnoses such as cervicogenic headache or medication overuse headache as well.

Conclusion: Children with recurrent headaches are severely affected. The ICHD classification criteria appeared feasible to distinguish between migraine and tension-type headaches in children, especially if a migraine-tension-type-index can be generated to allow for the presence of mixed headaches. There was a large group of non-classifiable headaches in our sample. Good diagnostic tools are essential to provide the best possible care and management.

Nieswand V, Richter M, Gossrau G. Epidemiology of Headache in Children and Adolescents-Another Type of Pandemia. *Curr Pain Headache Rep* 2020;24(10):62. doi: 10.1007/s11916-020-00892-6 [published Online First: 2020/08/26]

Singhi S, Jacobs H, Gladstein J. Pediatric headache: where have we been and where do we need to be. *Headache* 2014;54(5):817-29. doi: 10.1111/head.12358 [published Online First: 2014/04/23]

Lynge S, Hartvigsen J, Christensen HW, et al. Effectiveness of chiropractic manipulation versus sham manipulation on recurrent headaches in children aged 7-14 years, Protocol for a randomized clinical trial. *Chiropractic & manual therapies* 2019;27:40. doi: 10.1186/s12998-019-0262-y [published Online First: 2019/08/30]

Lynge S, Dissing KB, Vach W, et al. Effectiveness of chiropractic manipulation versus sham manipulation for recurrent headaches in children aged 7-14 years - a randomised clinical trial. *Chiropractic & manual therapies* 2021;29(1):1. doi: 10.1186/s12998-020-00360-3 [published Online First: 2021/01/09]

PAR06-07

The utilisation of regulated standardised care packages by Danish chiropractors: A mixed methods study

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Objectives: In Denmark, chiropractors in primary care work as independent private contractors regulated by the Danish National Health Authorities. The regulation includes partial reimbursement intended for standardised care packages for lumbar and cervical radiculopathy and lumbar spinal stenosis. Random checks have shown lower use than expected. This study aimed to describe and explore the utilisation of standardised chiropractic care packages and identify barriers to uptake.

Methods: A convergent mixed-method design was conceptualised. The use of standardised care packages was collected by register data. Potential determinants of difference in utilisation were assessed using a modified version of the Determinants of Implementation Behaviour Questionnaire (DIBQ) divided into 13 domains and sent to chiropractors in private clinics in Denmark in 2019. An open-ended question was added to the questionnaire, and thematic content analysis was applied. Qualitative findings were used to expand on the DIBQ data providing further insight into the clinicians' perspective on standardised care packages.

Results: Registry data of 244 included chiropractic clinics showed limited and inconsistent use of the standardised chiropractic care packages. The use of care packages ranged from 0-32 and the median was 0.96 (IQR 0-5.7). Over three years 32 (13%) did not use the packages at all.

A total of 269 chiropractors (44%) answered the DIBQ, and 45 provided data for the qualitative analyses. At least 60% of the clinicians answered 'Strongly agree' or 'Agree' in 10 out of 13 DIBQ domains suggesting a positive attitude towards using the standardised care packages. Three domains were identified as 'problematic' as more than 20% of clinicians disagreed or strongly disagreed. They

included 'Socio-political context' with 32% of the clinicians' disagreeing that primary health care was sufficiently oriented towards the delivery of the standardised care packages, 'Goals' with 31% disagreeing that delivering the care packages was a high priority, and 'Innovation' with 21% disagreeing that the care packages took little time and were simple to deliver, and that it was possible to tailor them to patients' and chiropractors' needs.

Four themes from the qualitative data were identified, of which one 'Positive attitudes and new ideas' supported the overall positive answers in the DIBQ. Three themes, 'A clash with the organization of clinical practice', 'No usage of care packages' and 'The chiropractor's role' expanded insight to the 'problematic' domains as they provided a more complete understanding of the three domains. These findings indicated that lack of usage of the standardised care packages was mainly related to the practical organization of standardised care, the chiropractor's role when managing patients, and the patient population of interest to the clinic (e.g., children, athletes).

Conclusion: In general, Danish chiropractors displayed positive attitudes towards standardised packages of care. However, considerable variation in the use of the standardised care programs was observed. Low utilisation seemed mainly related to logistics, the chiropractor's role, collaboration with GPs, and the patient population of interest to the clinic. These findings should be further explored in more extensive qualitative studies to inform implementation initiatives to increase and rectify utility.

PAR06-08

Attitudes and beliefs of health professionals concerning chiropractors and the chiropractic profession: A Systematic Review

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Study Objectives: The UK chiropractic profession almost exclusively provides care in the independent health care sector not in the public sector. In so doing there is a danger that its practice, skills, and approaches are either unknown or misunderstood by the wider health professional landscape. For example, surveys of GP attitudes toward chiropractors have been reported in several countries with varying degrees of anxiety around perceived lack of safety, efficacy, and inadequacy of training (Grace et al, 2016; Weis et al, 2018). However, a comprehensive systematic review of this area has not been carried out. This studies objective therefore was to explore attitudes and beliefs of health care professionals concerning the chiropractic profession and chiropractic care

Methods: A systematic review of literature published literature between 1992-2021 pertaining to attitudes and beliefs of health professionals concerning the chiropractic profession and chiropractic care was carried out. A detailed search strategy was conducted within the following data bases; MEDLINE, CINAHL, AHMED and Index to Chiropractic Literature (ICL). Studies were included if they specifically explored attitudes/perceptions/beliefs of other health professions concerning chiropractic/chiropractors or chiropractors using spinal manipulative therapy. Data extraction and quality assessment was carried out by at least 2 authors.

Results: Data base searches generated 245 publications with 42 publications being included in the review after duplicates and inclusion/exclusion criteria were applied. Sixteen studies were categorised as high quality with the remainder being medium quality. Eleven countries were represented mostly in the US/Canada (44%) with Australia and the UK totalling 16% respectively. Other countries included the Netherlands, New Zealand, South Africa, Germany, and Croatia. Most studies were cross sectional surveys (81%) with mixed methods and qualitative designs making up the remainder. Both qualified (80%) and student populations were represented. Amongst qualified professionals the largest proportion were physicians/GPs (67%) with nurses (7%), surgeons (5%) and manual therapists,

acupuncturists, osteopath's, midwives, physical therapists, and paramedics accounting for the remainder. For students, medical, physical therapy, nursing and physician assistants were included. Common themes arose within all groups although variation between national settings and students versus qualified professionals was apparent.

Amongst physicians/GPs, knowledge of the profession was generally low both. Despite this, perceptions persisted around variability in and diversity of practice, perceived lack or poor evidence and education, chiropractors focus on financial motivation and antiquated ideas/non-orthodoxy (e.g., Antivax). However, in integrated healthcare settings or where personal relationships and experiences were present, more positive attitudes were seen. This was also true when greater knowledge of the profession was present. Where studies had utilised educational interventions either with students or qualified healthcare providers, shifts toward more positive attitudes were found.

Conclusions: This systematic review summarised published studies investigating attitudes and perceptions of healthcare professions toward the chiropractic profession. Lack of knowledge/understanding has been a consent theme and may underpin negative perceptions with some evidence suggesting educational interventions shift perceptions. Other negative perceptions are associated with chiropractors themselves particularly diversity of approaches and unorthodoxy.

Grace S. et al., 2018. Themes Underlying Australian General Practitioner Views towards Chiropractic and Osteopathy: An Assessment of Free Text Data from a Cross-Sectional Survey. *J Evid Based Complement Alternat Med.* eCAM, 2018, 2786106.

Weis CA. et al., 2016. Attitudes Toward Chiropractic: A Survey of Canadian Obstetricians. *J Evid Based Complement Alternat Med.* 21(2):92-104.

PARALLEL SESSION 07

PAR07

Chiropractic Strategies and Protocols for Long-Haulers Syndrome and Immune Support

Robert Silverman, Dr. Robert Silverman, White Plains, United States

Long-haulers syndrome, more formally known as post-acute sequelae of SARS-CoV-2 (PASC), is defined as new, returning, or ongoing health problems appearing four or more weeks after being infected with SARS-CoV-2. PASC encompasses a wide range of symptoms. The most common include fatigue, cognitive dysfunction, neurological issues, headache, loss of taste and smell, GI issues, and muscle pain. A functional approach to treating these patients focuses on nutritional support, reducing inflammation, resolving intestinal permeability and dysbiosis. At the same time, underlying conditions such as metabolic disorders now need to be addressed expeditiously as patients with these conditions were more likely to experience severe disease.

In this incisive, 90-minute presentation, Dr. Rob Silverman leads participants through the evolving research on long-haulers syndrome and the latest clinical developments in diagnosis and treatment. He discusses the critical importance of calming post-COVID systemic inflammation through a multi-pronged protocol, including dietary approaches, selected nutritional supplements, improving the gut microbiome, and applying low-level laser therapy. Dr. Silverman will share his strategies to effectively combine laser therapy and nutritional protocols for optimizing patient outcomes.

Topics to be covered:

Current understanding of long-hauler COVID symptoms and prevalence.

How COVID-19 infection has long-term impacts on the lung-gut-brain axis and gut microbiome.

The role of systemic inflammation in long-hauler COVID.

Hands-on reproducible, implementable laser protocols for immune health.

Strategies for reducing inflammation, including diet, supplements, and lifestyle improvements.
Elucidate how to integrate nutritional protocols and laser therapy.

Al-Aly, Z., Xie, Y. & Bowe, B. High-dimensional characterization of post-acute sequelae of COVID-19. *Nature* 594, 259–264 (2021). <https://doi.org/10.1038/s41586-021-03553-9>

Davis H, Assaf GS et al. Characterizing Long COVID in an International Cohort: 7 Months of Symptoms and Their Impact. medRxiv 2020.12.24.20248802; DOI: <https://doi.org/10.1101/2020.12.24.20248802>

Havervall S, Rosell A, Phillipson M, Mangsbo SM, Nilsson P, Hober S, Thålin C. Symptoms and Functional Impairment Assessed 8 Months After Mild COVID-19 Among Health Care Workers. *JAMA*. 2021 Apr 7. doi:10.1001/jama.2021.5612

Huang Y, Pinto MD, Borelli JL, et al. COVID Symptoms, Symptom Clusters, and Predictors for Becoming a Long-Hauler: Looking for Clarity in the Haze of the Pandemic. medRxiv. 2021 Mar 5. doi: 10.1101/2021.03.03.21252086

Nalbandian A, Sehgal K, Gupta A, Madhavan MV, et al. Post-acute COVID-19 syndrome. *Nat Med*. 2021 Apr;27(4):601-615. doi:10.1038/s41591-021-01283-z

PARALLEL SESSION 08

PAR08

Drop Piece Lower Extremity Manipulation - Safer, Easier, Quicker for the Chiropractor

Stephen Perle, Clinical Sciences School of Chiropractic, University of Bridgeport, Bridgeport, United States

Practicing as a chiropractor is a physically demanding job. Disability from performing manipulation is an occupational hazard. Dr. Perle has taught ergonomics to engineering students in the US and China. A portable drop piece is an ergonomic manipulation tool that can substantially reduce stress on the chiropractor's body. It provides a safer for the chiropractor and easily controlled manipulation of the extremity joints. The focus of this workshop will be to use the drop piece to help perform lower extremity manipulation with the goal of helping active individuals people go beyond pain and towards better movement.

PARALLEL SESSION 09

PAR09

Axial Spondyloarthritis – Reviewing an underdiagnosed MSK condition - SIG Clinical Practice Workshop

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² Royal College of Chiropractors UK, Henley on Thames, United Kingdom

Spondyloarthritis represents a group of diseases characterised by inflammation of the spine and joints and is considered a heterogeneous group of immune-mediated inflammatory diseases that are divided into two subgroups according to the predominant symptoms, which may overlap. Axial Spondyloarthritis (axSpA) affects the spine and pelvis, and Peripheral Spondyloarthritis affects peripheral joints. The term **axial spondyloarthritis** has only been used since 2009 when the ASAS (Assessment of Spondyloarthritis International Society) classification criteria was developed. Ankylosing Spondylitis is defined by radiographic changes of the sacroiliac joints, and is known as

“radiographic” axSpA. MRI can identify inflammatory changes earlier, and this is termed “non-radiographic” axSpA. Psoriatic arthritis, reactive arthritis and enteropathic arthritis can all be classified as either axSpA, or peripheral SpA, depending on whether there is spinal involvement.

Despite a widespread lack of awareness of the condition, axSpA is **not rare** and affects an estimated 1 in 200 of the adult population in the UK (approximately 220,000). It typically takes over 8 years for a correct diagnosis to be reached. Early identification can help control symptoms and may reduce deformities.

It is important, therefore, for chiropractors to be aware of these conditions on a clinical basis and to refer for appropriate imaging or more specialist care. This workshop will present the most up to date information concerning AxSpA with the following components:

Introduction – presents the significance of axial spondyloarthritis to chiropractors
Interactive Group

Task – identification of patients with axial spondyloarthritis
The Evidence – related to the clinical assessment of axial spondyloarthritis

Case Study – consists of an interactive discussion of management considerations
A Quiz – will consist of a short MCQ quiz to review key points
Summary – will conclude the workshop and give time for questions

PARALLEL SESSION 10

PAR10

How to write a case study/series

Iben Axén, Karolinska Institutet & ELIB, Stockholm, Sweden

Study Objectives: To give an introduction on why and how to write a case study.

Methods and material: This lecture will introduce the reasoning behind what case studies are, why they may have merit, and how they should be written. This will include ethical aspects and consent. It will address the issue of engaging colleagues to collect data for a case series. The lecture is given from an editor’s perspective and will contain information about the publication process.

Results: During this lecture, examples of case studies will be shown and discussed.

Conclusion: This lecture should address what, why, when and how of writing a case study.

<https://chiromt.biomedcentral.com/submission-guidelines/preparing-your-manuscript/case-report>

<https://www.care-statement.org/checklist>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4175810/>

<https://www.bmj.com/content/350/bmj.h2693>

PARALLEL SESSION 11

PAR11

Infantile colic, brainstem dysregulation (vestibular, autonomic), upper-cervical dysfunction and mild birth trauma

Jan Hoeve, Chiropractie Staphorst, Staphorst, Netherlands

Background

The well-known rule-of-three diagnostic criteria of infantile colic were formulated in 1954. Since then a great deal of research has been carried out which was primarily focused on the excessive crying *per se*. Although a multitude of possible contributing factors have been proposed, the cause of colic

remains elusive and no distinct cure has emerged. Usually there is no underlying organic pathology. This lack of progress may signify only one of two things, either colic is such an intractably difficult problem that the intervening 68 year period was simply not long enough for it to be solved, or the research effort has been misdirected.

Brainstem reflexes.

Small infants function at a basic level of visceral brainstem reflexes, because higher inhibiting modulating structures are not sufficiently developed yet. Any non-pathological disorders observed probably reflect physiological dysregulation of these brainstem reflexes. Yet, the possibility that colic and associated childhood/adolescent migraine could be the clinical expressions of such dysregulation has remained largely unexplored.

Infantile colic.

In colicky babies the excessive crying is accompanied by a spectrum of little studied concomitant symptoms, which jointly point to vestibular and autonomic involvement. These are at the basis of a protocol that allows an objective and practical clinical diagnosis of infantile colic to be made, instead of the usual diagnosis by exclusion. In a recent study conducted in my clinic a five-point clinical index of vestibular (hyper)activity was presented and applied as a tool to evaluate brainstem dysregulation in colicky babies before and after treatment versus non-colicky babies. Following mild proprioceptive treatment vestibular regulation was improved by 96.5%.

Integrated hypothesis.

An integrated hypothesis was developed in my clinic that links both infantile colic and childhood/adolescent migraine to brainstem dysregulation secondary to occipital/upper-cervical dysfunction consequent to mild birth trauma. In both disorders vestibular dysregulation/ hyperactivity due to diminished cerebellar inhibition arising from aberrant proprioception may play an integral part. Treatment consisting of mild vibratory proprioceptive stimulation, is aimed at relaxation of suboccipital musculature and restoration of the normal proprioceptive traffic. This may re-establish the normal inhibitory cerebellar modulation of the vestibular system.

The hypothesis makes several testable predictions, one of which is that, at age 18, the prevalence of migraine in treated colicky babies should be lower than in those who had not been treated.

Migraine in former colicky babies.

Currently, we treat 1000 plus colicky babies per year. This puts us in a unique position to conduct a cohort study of migraine in treated former colicky babies compared to an untreated Finnish cohort. Preliminary results indicate that in our cohort the prevalence is lower by 80% compared to the Finnish cohort, by 67% compared to the general adult population and by 55% compared to the non-colicky babies of the Finnish study.

Practical.

During the practical portion of the session, the various concomitant symptoms are reviewed, their significance discussed and the application of the diagnostic protocol demonstrated. Treatment consisting of mild sensory neuromodulation is shown.

PARALLEL SESSION 12

PAR12

Cervical manipulation 2.0, adjusting to neutral

Russ Hornstein, Private practice, Lisbon, Portugal

Stability and proprioceptive calibration are the primary focus of Adjusting to Neutral.

The core techniques of Chiropractic are largely unchanged over the last 125 years yet we now know a great deal more about the control and regulation of the musculoskeletal system. The following is a

summary of current methods along with a new method proving to resolve subluxations much faster, improving both stability and coupled biomechanics.

One of the most common causes of subluxation in the spine is a high velocity lateral force on the intrinsic stabilising muscles. A trauma, or high velocity force that is beyond the capacity of the muscle to resist, elicits a protective reflex for the muscle to immediately relax. This keeps the muscle from tearing but this relaxation of the muscle, also called 'resetting the gain', leaves the muscle less reactive. When this affects an intrinsic muscle like the multifidus, the motor command to contract has less effect on the fibres of that joint level than the ones above and below; which share the same control centre. This not only de-calibrates its function but decreases its ability to stabilise and return to neutral. When we palpate, we will feel the misalignment but also a muscular resistance to return to neutral.

The neutral position is the centre of joint rotation and the most stable position in the joint's translation plane. A subluxated joint has an altered centre of rotation and is often unable to stabilise in translation. This will necessitate other muscles, generally extrinsics, to increase in tone to compensate. Since the extrinsic muscle origins and insertions are designed to actively bring the joint away from neutral they are not well suited to stabilise the joint over time and cause irregular forces in the joint, modifying its normal rotational and translation motions which we see clinically as pathomechanics and aberrant range of motion. Therapies that decrease extrinsic tension alone will give short term relief however if the tension was there to compensate for an intrinsic imbalance it typically comes back.

Adjusting to Neutral uses a high velocity thrust to elicit a relaxation of the muscle which is preventing the joint from returning to neutral. The setup starts with a single joint supported in the subluxated position and drives with a translation vector toward neutral. There is no end range loading so the stretch is very precisely targeted only on the tense intrinsic muscle creating resistance in returning to neutral. This is an HVLA adjustment with a cavitation but there is no gapping of the facet joints. The thrust is translational within the plane of the facet and generally taking the joint from an anterior protracted position in the setup and adjusting in a posterior retraction vector toward neutral. This offloads the anterior lateral intrinsics and enables the posterior lateral intrinsics (of the other side), such as the multifidus, to function more effectively and re-calibrate with the fibres above and below. Adjusting to Neutral is a powerful tool that can be easily integrated into any practice.

PARALLEL SESSION 13

PAR13

Vitamin D in Chiropractic practice

Simon Billings, Academy of Chiropractic Nutrition , Bournemouth, United Kingdom

Vitamin D is an endogenously produced steroid that has a plethora of effects throughout the body. Pre-vitamin D3 is made with skin exposure to UVB 3 or above and consequently hydroxylated into the inactive form measured in the blood, 25(OH)D3. Then via the kidneys and intracellularly in organs, into the active form 1,25(OH)D3, using magnesium as an enzyme co-factor.

Blood levels of 25(OH)D3 under 50 nmol/L are considered deficient, with some laboratories and vitamin D researchers calling the level between 50-85 nmol/L insufficient. This is based on studies showing a maximal flattening of para-thyroid hormone at 85 nmol/L and a 65% increase in calcium absorption from a fixed dose in patients with blood levels of 85 nmol/L compared to 50nmol/L.

Studies from people living in sunny climates and working outdoors year round have found that endogenous production frequently keeps blood levels between 100-200 nmol/L.

Currently, in the UK, 46% of the population is deficient at the end of winter. This figure rises much higher for at risk population groups, specifically: the elderly (less skin production of vitamin D), the obese (vitamin D is stored in adipose tissue reducing the amount in circulation) and people with higher

melanin content of the skin (ie non-caucasian). 87% of the UK population would be classified as deficient/insufficient, rising to 100% for the at risk groups.

While vitamin D deficiency has long been known to create neuromechanical symptoms, the initial theory was related to softening bones via a reduction in calcium absorption. However, more recently, research suggests that deficiency creates a pro-inflammatory state (systemic and neurological), leading to peripheral and central hypersensitivity.

Pain syndromes are usually bilateral and symmetrical in more extreme deficiencies (under 25 nmol/L), especially in the shin/legs, central low back pain and broad areas of muscle. These are frequently accompanied by profound fatigue and mood and behavioural disorders such as depression.

Between 25-50 nmol/L, the neuro-inflammation creating the hypersensitivity leads to an effective highlighting of latent neuromechanical dysfunction and connective tissue failure. Thus the presenting symptoms are frequent unilateral and asymmetrical, presenting as multiple neuromechanical pain disorders. Fatigue and mood disorders are often still present but at much lower levels.

Correction of vitamin D deficiency with supplements must recognise the levels produced when skin is exposed to UVB and the endogenous levels achieved naturally.

With thirty minutes of UVB exposure, the skin can make 10-20,000 iu of vitamin D. Supplementally a dose of 4-5000 iu vitamin D is a physiologically meaningful dose. It will correct most deficiency states and achieve levels in the 100's to mimic endogenous production. Recommended intakes of 200 iu as per the UK RI are physiologically meaningless and do not correct or prevent deficiency.

Vitamin D deficiency remains a common cause of pain, fatigue and depression presenting to Chiropractic clinics.

Vieth R AJCN 1999 May;69(5):842-56

Hypponen E AJCN 2007 Mar;85(3):860-8

Yilmaz 2016 Dec;19(12):1255-1262

PARALLEL SESSION 14

PAR14

Interpreting the research behind our conclusions

Trynke Hoekstra, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

About two medical scientific papers appear in our search engines every minute and an overwhelming number appear in the media. How can we navigate this information overload and properly assess the quality of the reported studies? This talk will highlight and explain several methodological and statistical issues such as study designs, statistical significance versus clinical relevance, risk estimates and differences between effectiveness and efficacy in order to provide you with the necessary tools to be able to critically interpret and reflect on the findings reported in the scientific literature.

PARALLEL SESSION 15

PAR15

The Role of Physical Activity, Exercise, Sedentary Behavior and Overtraining on Growth, Development and Spinal Pain in Children

Lise Hestbaek², [Sue Weber](#)¹

¹ , ,

² EAC, SDU, Odense, Denmark

This Masters class will explore of physical activity, exercise, sedentary behavior and overtraining in the developing child. These all affect development in different ways including cardiovascular health, musculoskeletal health, mental, behavioral health, as well as physical, social, and cognitive development. There has been an alarming decrease in physical activity among children internationally which has been further fueled by the COVID pandemic.

We will present the recent research looking at physical activity and musculoskeletal health and how we as chiropractors can address this ever-growing problem.

This lecture will explore the physiological, neurological and behavioral aspects of physical activity, sedentary behavior and overtraining in children. An important part of this lecture will be to look at how the negative spiral of inactivity can be addressed both on a societal level as well as on an individual level. We will also discuss the other side of the coin where overtraining can result in spinal injury particularly the contributing factors during growth and development. We will present cases for participants to discuss to better understand how practitioners can work to help our pediatric patients and their families.

PARALLEL SESSION 16

PAR16

The Thompson Technique analysis and approach to sacral complications and diagnosis

[Robert Jackson](#), United States

Objective of this presentation will be to share the neurological and mechanical findings with sacral biomechanical complications.

Methods used in this presentation will be the certified analysis and corrections of sacral biomechanical misalignments.

Anticipated results and conclusion from attending this presentation will be that each doctor will be able to return to their unique practices with the knowledge and ability to complete a detailed analysis of sacral complications and to administer the associated corrections found in the Thompson Technique approach.

PARALLEL SESSION 17

PAR17

Sharpen your imaging skills on these common and not so common cases from chiropractic practice

Inger Roug, AECC-UC, Bournemouth, United Kingdom

Study Objectives: This case based learning formatted presentation will cover the most common significant pathologies presenting in chiropractic practice. In addition, a review of the imaging rate pendulum and interpretation of imaging justifications at the AECC-UC clinic will be discussed. When you hear hoofs beating you usually think of horses, however sometimes you should consider zebras. The presented cases aim to sharpen the reader's image interpretation and referral skills and refresh their memory for use in Monday morning practice.

Methods and material: Imaging cases were gathered in a chiropractic university clinic and chiropractic radiologist practice setting. Imaging cases were gathered from 2015-2022. Patient consent has been obtained in all cases.

Results: Select cases are presented where imaging findings altered management. Considering imaging rates, the number of authorised/unauthorised radiology referrals revealed significant inconsistency amongst AECC-UC clinic referral authorising radiographers.

Conclusion: It behoves the chiropractic physician to be mindful of less common causes of common musculoskeletal problems in chiropractic practice. When interpreting imaging referral guide-lines one must be sure to consider our duty of care towards our patients.

Bussièrès AE, Taylor JA, Peterson C. Diagnostic imaging practice guidelines for musculoskeletal complaints in adults-an evidence-based approach-part 3: spinal disorders. *J Manipulative Physiol Ther.* 2008 Jan;31(1):33-88. doi: 10.1016/j.jmpt.2007.11.003. PMID: 18308153.

Bussièrès AE, Peterson C, Taylor JA. Diagnostic imaging guideline for musculoskeletal complaints in adults-an evidence-based approach-part 2: upper extremity disorders. *J Manipulative Physiol Ther.* 2008 Jan;31(1):2-32. doi: 10.1016/j.jmpt.2007.11.002. PMID: 18308152.

Bussièrès AE, Taylor JA, Peterson C. Diagnostic imaging practice guidelines for musculoskeletal complaints in adults--an evidence-based approach. Part 1. Lower extremity disorders. *J Manipulative Physiol Ther.* 2007 Nov-Dec;30(9):684-717. doi: 10.1016/j.jmpt.2007.10.004. PMID: 18082743.

PARALLEL SESSION 19

PAR19

The effectiveness of chiropractic manipulation on children with headaches- evidence and clinical management of children aged 0-18 with headaches

Susanne Lynge¹, Kristina Boe Dissing², Henrik Wulff Christensen³, Lise Hestbaek², Werner Vach⁴

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³ Nordic Institute of Chiropractic and Clinical Biomechanics, Odense, Denmark

⁴ Basel Academy, Basel, Switzerland

The primary investigator and treating chiropractor of the large Danish randomized clinical trial investigating the effectiveness of chiropractic manipulation versus sham manipulation for recurrent

headaches in children aged 7-14 years will present the study. This study included 199 children aged 7 to 14, who had at least one episode of headache or migraine per week, for at least half a year and with at least one musculoskeletal dysfunction identified in spine, pelvis or TMJ.

Information on number and severity of headaches were collected pre-trial for 4 weeks as well as use of medicine for headaches. Upon entering the trial all children received a screening where a neurological and chiropractic examination was performed by the investigating chiropractor and if found eligible for participation, the children would then be randomized into one of two groups: the treatment group, where each child received chiropractic spinal manipulation according to individual needs, size and age and the control group, where each child would receive approximately 8 treatments of sham manipulation. All children would participate for four months and all children in both groups received simple standard oral and written advice regarding sleep, regular meals, reduction of screen time and regular physical activity.

Collection on information on number and severity of headaches as well as use of headache medicine during participation period was done by sms-text messages sent to the child's parents once per week. Global perceived effect was collected the same way when the 4 months trial period for the child terminated.

The results of this trial have been published in Chiropractic and Manual Therapies January 2021 and shows that chiropractic spinal manipulation resulted in significantly fewer days with headache and better global perceived effect compared with sham manipulation.

The course will provide information on interviewing children with headaches and migraines in different age groups, knowledge on causes of headache in children, what to include in the neurological examination of these children and how to detect Red Flags. Furthermore the chiropractic examination and treatment of the children in the study will be presented as well as the treatment strategy and relevant advices to children with headache and migraine. Safety and when to refer children to other health care professionals is also an important and relevant in this presentation

PARALLEL SESSION 20

PAR20

Lumbar manipulation 2.0: the role of spinal calibration in force absorption, stability and biomechanics of the lumbar spine

Russ Hornstein, Private practice, Lisbon, Portugal

Force absorption in the lumbar spine is primarily managed by controlled flexion. This is accomplished by an eccentric contraction of posterior intrinsic muscles. In normal gait, this is classically the role of the multifidus. With the impact of each step, the multifidus immediately needs to engage and lengthen to absorb this force. In cases where there is weakness or poor reactivity of these muscles, the joint fails to absorb the force at the involved segments. This leaves the joint with a weak vector of motion and increases the load on the discs and other joint structures when passing through that vector.

The intrinsic muscles also stabilise the joint in active voluntary motions. When bending into flexion, the multifidus would be very lengthened. If it is weak, it will not respond with sufficient force to be able to maintain the integrity of the joint. Without sufficient support, it could more easily move into a pathological position and sprain or strain the joint.

The intrinsic muscles are also very important for managing the proper biomechanics of the joints. The intrinsic muscles lack the leverage to create large motions of the joints however they are especially well suited to holding and guiding the joint motion. When a joint is at its end range and returns toward neutral, the intrinsic muscles not only stabilise the joint but also contract to maintain the appropriate axis of rotation of the joint while the extrinsics create the bulk of the power. Without balanced intrinsic function, the

axis of rotation of a joint shifts toward the muscles with the greatest tension. This compromises mechanics, stability and accelerates wear in the joints.

Lumbar subluxations involving weakness of an intrinsic muscle will present with all of the above issues and their concomitant findings such as weakness in certain positions, postural changes, poor joint mechanics, limited motion and pain. If we restore the intrinsic strength and balance first, many of these consequences will also resolve.

Intrinsics, like all other muscles, have antagonists. Opposite to a weakened (or actively inhibited) intrinsic extensor, there will generally be a hypertense antagonist pulling into flexion. If we apply our chiropractic HVLA fast stretch to the hypertense muscle resisting the joint from returning to neutral, we will elicit a resetting of the gain and relaxation. If the antagonist tension is then reduced, it will decrease the active inhibition of the 'weak' intrinsic and allow for balanced function immediately. Adjusting toward neutral calibrates the tension of the affected joint.

The high degree of precision in solely resolving these primary issues of intrinsic imbalances are most likely the reason for the strong and lasting effect of Adjusting to Neutral. Further investigation is necessary to develop and research the full scope of the treatments.

POSTER PRESENTATIONS

INTRODUCTION

All posters will be on display from 10.00 hrs. on Friday 27 May until 12.00 hrs. on Sunday 29 May. Presenters have been asked to be present by their poster for discussion during the last 30 minutes of the lunch break on Friday and Saturday.

The posters are clustered according to the following topics:

1. Literature reviews → LIT-01
 - Filtered resources appraise the quality of studies and often make recommendations for practice.
 - Systematic reviews
 - Critically-appraised topics
 - Critically-appraised individual articles
2. Clinical studies → CLI-01
 - Primary “or unfiltered” clinical research that need to be accessed for validity and reliability to be appropriately interpreted.
 - Randomized controlled trials
 - Cohort studies
 - Case-controlled studies
 - Cross sectional surveys
3. Cases → CAS-01
 - Systematically recorded anecdotal evidence. Given their intrinsic methodological limitations, including lack of statistical sampling, they are placed at the bottom of the hierarchy of clinical evidence.
 - Case series
 - Case reports
4. Basic Science → BSC-01
 - Pre-clinical research, to improve scientific theories for better understanding and prediction of phenomena or to provide insights towards potential efficacy of a certain therapy.
 - Experiments
 - Animal models
 - Laboratory studies
5. Educational → EDU-01
 - Research related to the field of education and involve a variety of methods and various aspects of education.
 - Student learning
 - Teaching methods
 - Teacher training
 - Classroom dynamics
6. Other → OTH-01
 - Research that does not fit in to any of the other categories.

LIT-01

Minimal clinical datasets for spine related musculoskeletal disorders in primary and outpatient care settings: a scoping review

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⁴ St. Michael's Hospital, Unity Health Toronto, Toronto, Canada

⁵ Department of Chiropractic Medicine, Balgrist University Hospital, Zurich, Switzerland

Objectives: Musculoskeletal (MSK) disorders are a leading cause of disability worldwide, with spine disorders key contributors of this burden. Although there have been numerous efforts to establish core outcome sets for clinical trials and research, little is known about the availability and characteristics of minimal clinical datasets for spine related MSK disorders in primary and outpatient care settings, and their utility for improving healthcare quality. We aim to identify and map the current literature on minimal clinical datasets for measuring and monitoring health and functioning in patients with spine related MSK disorders in primary and outpatient care.

Methods: Our scoping review protocol was developed in accordance with the 2020 JBI methodology for scoping reviews. We included studies of minimal clinical datasets on spine related MSK disorders designed for primary care and outpatient clinical practice settings. We conceptualised a minimal clinical dataset as a standardized set of elements covering key data and patient-centered outcomes that should be minimally reported and measured. They should be practical and time efficient to use during routine clinical care in an outpatient or primary care setting. We anticipated that consensus-based studies (e.g., Delphi studies), interventional, observational, feasibility, and linguistic validation studies may be the most common designs identified.

Seven databases were searched (MEDLINE, CINAHL, Cochrane Library, Index to chiropractic literature, MANTIS, ProQuest Dissertations & Theses Global) from inception to July 25, 2021. Two independent reviewers screened and identified relevant studies using prespecified eligibility criteria. We will chart and map the eligible evidence using a standardized extraction form created through an iterative process with the research team. Each item of eligible minimal clinical datasets will be mapped to domains of the World Health Organisation International Classification of Functioning, Disability and Health (ICF) using established linking rules. We will present our findings as a descriptive summary.

Results: Our literature search identified 5587 citations. After title and abstract screening, 292 references have been selected for full-text analysis. Additional information about key concepts and findings will be presented based on scoping review progress by the conference date.

Conclusion: Our review will map the current literature, identify research gaps, and inform areas of future research with respect to minimal clinical datasets for spine related MSK disorders in primary care. This may lead to improved quality of routinely collected healthcare data in primary and outpatient care settings and help facilitate more reliable and valid measurement and monitoring of patient health and functioning in primary MSK healthcare in the future.

Impact of Audible Pops Associated with Spinal Manipulation on Perceived Pain in Experimental Subjects: A Literature Review

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Study Objectives: An audible pop is the sound that can derive from an adjustment in spinal manipulative therapy and is often seen as an indicator of a successful treatment. A review conducted in 1998 concluded that there was little scientific evidence to support any therapeutic benefit derived from the audible pop. Since then, research methods have evolved considerably creating opportunities for new evidence to emerge. It was therefore timely to review the evidence.

Methods and material: Using the search terms “audible release/pop”, “joint cavitation/cracking”, “spinal manipulative therapy”, “chiropractic adjustment/manipulation”, “high velocity low amplitude adjustment”, “spinal manipulation” and “pain” individually and jointly, several databases were searched for literature starting from 1998. Two reviewers independently selected studies, extracted data, and assessed risk of bias and quality of the evidence using the Downs and Black checklist. Results of the included literature were synthesized into a systematic review with the main outcome being pain.

Results: Five original research articles were included in the review, of which four prospective cohorts and a randomized control trial. The 5 studies resulted in the inclusion of 359 participants. All studies reported similar results: regardless of the area of the spine manipulated or follow-up time, there is no evidence of improved pain outcomes associated with an audible pop. Flynn et al.¹ demonstrated that there was no relationship between the presence of an AP when receiving SMT and outcomes in patients with LBP in the short term. In addition, Cleland et al.² and Sillevs and Cleland³ reported similar results for patients with neck pain in the short-term suggesting APs in these conditions are not associated with improved pain outcomes regardless of the area of the spine manipulated. Furthermore, Flynn et al.⁴ also demonstrated no improved pain outcomes associated with the AP in the long-term, strengthening the conclusion of no association. Interestingly, Bialosky et al.,⁵ using a classic pain experimental set up with healthy patients without spinal pain, found that hypoalgesia as measured using external pain stimuli such as heat is associated with spinal manipulation but that the AP is not required for this effect to be generated.

Conclusion: Whilst there is still no consensus among chiropractors on the association of an audible pop and pain outcomes in spinal manipulative therapy, knowledge about the audible pop has advanced. Presently, available literature suggests that an audible pop is not considered to possess independent therapeutic benefit in form of pain outcomes in spinal manipulative therapy. It is still unclear as to the factors that underly clinical improvement associated with approaches that include SMT, but it is likely to include non-local central nervous system processes (top-down mechanisms) as well as local tissue-based processes (bottom-up mechanisms). This abstract supports the notion that clinicians need not either be overanxious or overemphasize the presence of a perceived AP as an indicator of successful treatment. However, noting that many practitioners and patients still consider this aspect an important part of the SMT experience, further research would be helpful in fully comprehending this phenomenon.

Flynn TW, Fritz JM, Wainner RS, Whitman JM. The audible pop is not necessary for successful spinal high velocity thrust manipulation in individuals with low back pain. *Physical Medicine and Rehabilitation*. 2003;84(7):1057-1060.

Cleland JA, Flynn TW, Childs JD, Eberhart S. The audible pop from thoracic spine manipulation and its relation to short term outcomes in patients with neck pain. *JMMT*. 2007;15(3):143-154.

Sillevis R, Cleland J. Immediate effects of the audible pop from a thoracic spine thrust manipulation on the autonomic nervous system and pain: a secondary analysis of a RCT. *JMPT*. 2011;34(1):37-45.

Flynn TW, Childs JD, Fritz JM. The audible pop from high velocity thrust manipulation and outcome in individuals with low back pain. *JMPT*. 2006;29(1):40-45.

Bialosky JE, Bishop MD, Robinson ME, George SZ. The relationship of the audible pop to hypoalgesia associated with HVLA thrust manipulation: a secondary analysis of an experimental study in pain-free participants. *JMPT*. 2010;33(2):117-124.

CLINICAL STUDIES

CLI-01

Direction specific low back pain subgroups demonstrate consistent muscle activation and thoraco-lumbar kinematic relationships across everyday tasks

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² Cardiff University, Cardiff, United Kingdom

Study Objectives: Evaluation of trunk muscle activity and thoraco-lumbar kinematics during sagittal bending has demonstrated that flexion and extension aggravated LBP subgroups show relationships that can distinguish between specific groups and controls. The findings suggest that participants with flexion or extension related LBP use or adopt different motor control and kinematic strategies when performing a spinal flexion task, and that the thoracic region plays a fundamental role in such movements. To date, these associations have only been explored during tasks in the sagittal plane, and may be related specifically to this movement. The aim of this study was to investigate these relationships during further activities of daily living.

Methods and material: Spinal kinematics and trunk muscle activity of 50 subgrouped NSCLBP participants (27 Flexion Pattern (FP), 23 Active Extension Pattern (AEP)) and 28 healthy controls were investigated using 3D motion analysis (Vicon™) and surface electromyography during a range of daily tasks including Box lift, Box replace, Reach up, Step up, Step down, Stand to sit and Sit to stand. Mean sagittal angles for the upper thoracic (UTx), lower thoracic (LTx), upper lumbar (ULx) and lower lumbar (LLx) regions were compared with normalised (% sub-maximal voluntary contraction) mean amplitude electromyography of bilateral transversus abdominis/internal oblique, external oblique, superficial lumbar multifidus and erector spinae (longissimus thoracis) between groups. Pearson correlations were computed to assess relationships (significance $p < 0.05$).

Results: Many of the significant relationships between thoraco-lumbar kinematics and muscle activity demonstrated during a sagittal bending task, were shown to also exist during other activities of daily living. Examples of contrasting strategies between AEP and FP subgroups were again shown. In the FP group, examples of the positive relationship between LTx movement and muscle activity, and the negative relationship between LLx movement and muscle activity were apparent in each of the seven tasks. In the AEP group, fewer significant associations were found, however a significant negative relationship between LTx movement and EO activity was demonstrated during Box Lift, Box Replace, Reach-Up, and Sit-to-stand tasks. Correlations were moderate to strong, with values ranging from -0.812 to 0.754.

Conclusion: The results demonstrate that correlations in muscle activity and regional spinal kinematics can distinguish between AEP, FP and pain free control groups, and provide evidence to support the theory that those with flexion or extension related LBP adopt different motor control and kinematic strategies when performing a range of everyday activities. Now that these strategies have been demonstrated to be consistent during activities beyond the sagittal plane, further support is provided for greater specificity in active physical interventions. As effectively mechanical biomarkers, such findings may be useful to help inform treatment in these groups.

CLI-02

Clinical characteristics of chiropractic paediatric practice and nonsynostotic deformational plagiocephaly in the Netherlands

Camille Verfaillie¹, Alister Du Rose², Aurelie Marchand³

¹ - , Deurne, Netherlands

² AECC UC, Bournemouth, United Kingdom

³ AECC University College, Bournemouth, United Kingdom

Study Objectives: To determine the clinical characteristics of paediatric chiropractic practice and the management of nonsynostotic deformational plagiocephaly (NDP) in the Netherlands. The association between the treatment techniques and adverse events; and any association between treatment techniques used for NDP and the number of treatments needed for full resolution of the head turning preference were also investigated.

Methods and material: The research design was a cross-sectional survey of practising chiropractors in the Netherlands who were registered with one of the three Dutch chiropractic associations. Data collection was performed through a single one-time online anonymous questionnaire. Descriptive statistics were used to present data. Chi-square testing was performed to determine if there was an association between the treatment techniques used and adverse events for each age group. A one-way ANOVA test was performed to determine associations between treatment techniques used for NDP and number of treatments needed for full resolution of the head turning preference.

Results: Seventy-eight chiropractors completed the survey of which 85.9% (N=67) treated paediatric patients. Of those, 73.1% (N=38) managed NDP. Chiropractors most frequently referred to general practitioners (26.9%, N=52) and received most referrals from midwives (17.4%, N=25). The most common presentations/diagnoses were head turning preference (with or without NDP) (20.9%, N=39) for 0-11months-olds, musculoskeletal conditions (18.6%, N=31) for 1-6-years-olds, and low back and neck pain, both at 12% (N=40) for 7-18-years-olds. The most common treatment technique was 'touch and hold' (14.5%, N=33) for 0-11-months-olds, activator technique (13.5%, N=32) for 1-6-years-olds, and exercises (16.2%, N=47) for 7-18-years-olds. In the under seven age categories, the majority (N=35) did not experience side effects/adverse events, whereas local discomfort or pain in area of treatment was frequently reported in 7-18-years-olds (N = 39). No statistically significant association between treatment techniques and side effects/adverse events were shown for any age group, nor between treatment techniques for NDP and number of treatments needed for full resolution of the head turning preference. NDP is encountered at 1.53 months ($M=1.53$, $SD=0.554$) on average and if caused by a head turning preference, participants expected 4.15 treatments ($M=4.15$, $SD 1.562$) for full resolution of the head turning preference.

Conclusion: This study highlights the spectrum of paediatric conditions treated and the treatment techniques utilised by chiropractors in the Netherlands. Chiropractors should be aware of NDP and their important role in its management. Other healthcare professionals may be encouraged to incorporate a multidisciplinary approach for paediatric patients, as this study provides an insight into the role chiropractors can have in paediatric case management.

CLI-03

Pointe: comparing quantitative measurements of pointe training readiness in amatorial ballet dancers

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¹ AIC, Cagliari, Italy

² , ,

Study Objectives: There is no gold standard in dance and sport science to assess for pointe training readiness. The objective of this study was to provide a critical review of the current literature on pointe training readiness and to evaluate a screening protocol to assist adolescent ballet dancers in their transition to pointe training. Ballet dancing is one of the most popular physical activities among children and adolescents. Chiropractors care for growth and sport-related musculoskeletal health, therefore they are in the position to spot objective weaknesses in these delicate population if provided with an objective screening protocol.

Methods and material: This cross-sectional study evaluated 30 amatorial ballet dancers (11-17) divided into two groups: one pre-pointe training and one already dancing on pointe. Quantitative measures were taken for ankle AROM (knee to wall test and standard goniometer); active weight-bearing turnout (footprint device) isometric strength (dynamometer); core endurance (position hold with a chronometer and a pointing laser); balance and endurance: airplane and relevè endurance tests (AMES) device performed in neutral and turnout positioning. Demographic data and dependent variables of interest were analyzed with the IBM SPSS 24 by an independent statistician blind to the research question. The protocol was approved by a human ethical committee. Written consent was obtained by parents/guardians and verbal assent was given by the participants.

Results: The data analysis demonstrated abnormal distribution of demographics parameters in the two groups. The Mann-Whitney U test showed statistical differences for total turnout (P. 0,009); the airplane test (P.0,000 bilaterally); the relevè endurance test (P. 0,007; L 0,018); the core endurance test (P. 0,011). The pointe group also performed better on the turnout airplane test (P.0,014; 0,002) and the turnout relevè endurance test (P. 0,000; L 0,001). In the pre-pointe group, those girls who already had their menarche showed better results with the left neutral airplane test (0,030); core endurance (0,030), right relevè endurance (0,030) and left hip adduction strength (0,017).

Conclusion: Pointe training readiness is multifactorial. This study corroborates the current guidelines for turnout requirements with a minimum of 60° ROM. It also highlights that airplane, core endurance and relevè endurance tests could be used for PTR screening, with a minimum of three to four repetitions for airplane tests; 16 to 20 for relevè and a core endurance hold of 130 seconds. This study is the first to evaluate turnout-modified experimental functional tests and turnout measurement between pre-pointe and pointe training dancers. Further research is suggested with larger sample size and a trial on the effect of chiropractic care on the performance at these specific tests.

Altmann, Carlie, Jennifer Roberts, Rolf Scharfbillig, and Sara Jones. "Readiness For En Pointe Work In Young Ballet Dancers Are There Proven Screening Tools And Training Protocols For A Population At Increased Risk Of Injury?". *Journal Of Dance Medicine & Science* 23, no. 1 (2019)

DeWolf, Andrew, Alyssa McPherson, Kathryn Besong, Claire Hiller, and Carrie Docherty. "Quantitative Measures Utilized In Determining Pointe Readiness In Young Ballet Dancers". *Journal Of Dance Medicine & Science* 22, no. 4 (2018)

Nelson, Luke, Henry Pollard, Rick Ames, Brett Jarosz, Pete Garbutt, and Cliff Da Costa. "A Descriptive Study Of Sports Chiropractors With An International Chiropractic Sport Science Practitioner Qualification: A Cross-Sectional Survey". *Chiropractic & Manual Therapies* 29, no. 1 (2021)

Weighart, Hannah, Noelle Morrow, Sarah DiPasquale, and Stephen J. Ives. "Examining Neuromuscular Control The Vastus Medialis Oblique And Vastus Lateralis Muscles During Fundamental Dance Movements". *Journal Of Dance Medicine & Science* 24, no. 4 (2020)

The Swiss chiropractic practice-based research network: a cross-sectional analysis of participating clinicians and primary-care practices to inform future research

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Objectives: The Swiss chiropractic practice-based research network (PBRN) is a nationwide project developed to advance clinical research within the Swiss chiropractic community. The aim of this study was to describe the characteristics of clinicians recruited to the PBRN to guide subsequent practice-based research in the areas of chiropractic and musculoskeletal (MSK) health.

Methods: We performed a cross-sectional analysis of chiropractors who provided consent to participate in ongoing self-selected research activities and completed a PBRN entrance questionnaire. Participant recruitment occurred between 9 September 2021 and 19 December 2021. All clinician members of the Swiss Chiropractic Association (ChiroSuisse) were eligible. The questionnaire consisted of items relating to demographics, practice characteristics, confidence in the management of low back pain, biomedical versus biopsychosocial treatment orientation, use of an electronic health record (EHR) system, practice changes due to the COVID-19 pandemic, and motivation (0-100 VAS) to participate in a subsequent patient cohort pilot study nested within the PBRN infrastructure.

Clinician characteristics were presented as descriptive statistics. Multivariable logistic regression was used to assess the association between clinician characteristics (age, practice size, language of practice, EHR use) and motivation to participate in the patient cohort pilot study (Yes/No, cut point operationalised as VAS score ≥ 70).

Results: Among 326 eligible chiropractors, 147 enrolled in the PBRN (45% participation proportion; mean age 46 [SD, 13] years; 53% men). 65% of participants reported practicing with other chiropractors, while 41% endorsed sharing a practice with other healthcare professionals – the most common being massage therapists. Low back pain without leg pain (96%) and neck pain without arm pain (94%) were described as the two most commonly managed patient complaints. 56% of PBRN members reported use of an EHR system for clinical record keeping. Clinicians endorsed high confidence for the management of low back pain (mean score 5.6; range 4-60, lower score means greater self-confidence) and higher biopsychosocial versus biomedical treatment orientations (52 versus 32; range 10-60 each, higher score means greater treatment orientation). Most clinicians described their work hours and patient numbers as unchanged compared with before the COVID-19 pandemic, 63% and 75%, respectively. A total of 56 participants (38%) rated themselves ≥ 70 on motivation to participate in the patient cohort pilot study. Those practising in a clinic with 2 or 3 chiropractors, compared with those in solo practice, were 2.5 times more likely to express motivation to participate in the patient cohort pilot study (OR, 2.5; 95% CI, 1.1 to 5.8). Age, language of practice, and EHR use were not found to be associated with motivation for the patient cohort study.

Conclusion: The Swiss chiropractic PBRN has enrolled almost half of all Swiss chiropractors. The first nested project to be conducted within this PBRN infrastructure (The Swiss Chiropractic Cohort (ChiCo) Study) is registered as a 12-week prospective cohort pilot study and will recruit consecutive patients with a new episode of MSK pain from PBRN participating practices to assess feasibility of methods and describe the clinical course of patients MSK pain.

CLI-05

Headache in Chiropractic practice project – the HIC project

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Objective: Headache is among the top 10 causes of disability worldwide, however, there is only superficial knowledge about how headaches are managed, and which diagnoses, and treatment strategies are used in chiropractic clinics. Due to the potential severe consequences caused by headaches, it is important to develop this research area. This project aims to answer some of these uncertainties concerning patients with headache in chiropractic practice. The Headache in Chiropractic practice project (HIC project) is based at the Chiropractic Knowledge Hub in Denmark and is funded by the Danish Chiropractic Research Foundation. The overall aims of the HIC project are:

To investigate headache diagnoses made in chiropractic practice and the prevalence hereof

To investigate how chiropractors approach management and treatment of patients with headache in Danish chiropractic practice

Methods: The project is composed of two main sub-studies:

The EHR system study, which is a pilot study focusing on retrieving data from a Danish electronic health record system on patients with headache and the usability hereof. 8-10 chiropractors will be included. The questionnaire study, which contains two parts. All chiropractors in private practice in Denmark will be invited to participate.

An online survey will be developed and validated concerning headache diagnoses, management strategies, and different treatment types applied for patients with headaches.

A logbog will be developed for registering prevalence of headache and the diagnoses given in a 4-week period.

Results: The HIC project commenced in March 2021 and data collection, analyses, and publication of results are estimated to run over two and a half years. The project is a collaboration between the Chiropractic Knowledge Hub in Denmark and the University of Southern Denmark (SDU). The project leader is Kristina Boe Dissing, Ph.D., senior researcher, at Chiropractic Knowledge Hub and chiropractor in private practice.

Conclusion: The HIC project has the potential to provide the public, health care professionals, and stakeholders with knowledge on the present status of headache diagnoses in chiropractic clinics in Denmark and the management hereof. The results will be used to build future research strategies by forming the basis for larger cohort studies and randomized clinical trials to assess the healthcare needs and treatment effects for patients with headache diagnoses.

Global, regional, and national burden of migraine and tension-type headache, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet Neurol* 2018;17(11):954-76. doi: 10.1016/s1474-4422(18)30322-3 [published Online First: 2018/10/26]

Moore C, Leaver A, Sibbritt D, et al. The management of common recurrent headaches by chiropractors: a descriptive analysis of a nationally representative survey. *BMC Neurol* 2018;18(1):171. doi: 10.1186/s12883-018-1173-6 [published Online First: 2018/10/20]

Long-term multidisciplinary team-based management of back pain: A feasibility study (TeamBack)

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Study Objectives: Multidisciplinary treatment is advocated for handling complex low back pain (LBP). While some evidence indicates that multidisciplinary treatment and self-management support is more effective than usual care and physical treatments in the short term, the results are more spurious long term. This may be due to trial setups not providing long-term follow-up. However, LBP typically presents with repeated or intermittent periods of flare-ups; it is precisely the long-term effect that is most relevant.

Providing long-term multidisciplinary care is common in conditions such as diabetes and rheumatoid arthritis, and there are indications that this also benefits LBP. Nevertheless, it is unclear how to organize such care in a complex health care system with multiple tiers, professions, and gates of patient entry.

The objective of this study was to test feasibility of delivering a long-term multidisciplinary team-based management strategy (MaS) implemented in a specialized hospital spine center setting.

Methods and material: We developed MaS following the framework provided by the Medical Research Council.

We conducted a single-arm feasibility study including patients from the Spine Center of Southern Denmark with persistent LBP (> 3 months) and either high activity limitations (Oswestry Disability Index [ODI] > 40/100) or in a severe pain trajectory (self-reported visual trajectories). We excluded surgical candidates.

The multidisciplinary team consisted of a: chiropractor, physical therapist, nurse, and medical doctor (medical consultant). The team conferred patients before and assessed them during the initial visit. Follow-up was provided at fixed time points and ad-hoc during three months. Shared-decision making was used to specify goals to improve function (goal-attainment scale).

The chiropractor was responsible for diagnostics, pharmacology, social status and functioned as coordinator. The physical therapist assessed the participant's function and planned exercise/functional/behavioral intervention based on individual needs. The nurse provided cognitive-behavioral coaching. The team supported self-management throughout the intervention.

Using surveys and semi-structured focus-group interviews, we assessed feasibility by evaluating patients' experience, including and retaining participants, and collecting patient-reported data. In addition, we assessed clinicians' workload.

Preliminary results: We aimed to assess 66 patients between November 2021 and January 2022, of whom 40 would be eligible, and 25 would agree to enrollment. Instead, we assessed 72 patients to identify 24 eligible who all were enrolled, one less than planned due to COVID and lack of patients fulfilling the inclusion criteria. 16/24 were female with a median age of 57. The median episode duration was 15 months (interquartile range = 5-127), ODI of 43/100 (39-60), back pain 8/10 (5-10), leg pain 6.5/10 (3-10), and 13/24 reported a severe pain trajectory. Only 19/24 recorded a goal, primarily to increase the ability to walk and sustain static postures. The trial's procedures were challenging for the administrative staff.

The feasibility study is ongoing, but all data and interviews will be available and analyzed in May 2022.

Conclusion: Implementing a long-term multidisciplinary management strategy into a specialized spine center unit was challenging. The initial findings suggest that when designing and planning the randomized trial, we must critically consider the inclusion criteria and the inclusion procedure.

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Kongsted A, Kent P, Axen I, Downie AS, Dunn KM. What have we learned from ten years of trajectory research in low back pain? *BMC Musculoskeletal Disorders*. 2016 Dec

Eklund A, Jensen I, Lohela-Karlsson M, Hagberg J, Leboeuf-Yde C, Kongsted A, et al. The Nordic Maintenance Care program: Effectiveness of chiropractic maintenance care versus symptom-guided treatment for recurrent and persistent low back pain-A pragmatic randomized controlled trial. *PLoS One*. 2018

CLI-07

Pain treatment by removing medication - is brief intervention method feasible in older adults using CNSD medications?

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Objectives: Central nervous system depressant medications (CNSD) including benzodiazepines, z-hypnotics and opioids are regularly prescribed for older patients. We have previously described how older adults are at risk for medication overuse. We have also demonstrated that the method of brief intervention (BI) is useful for reducing pain medication overuse in headache. Here, we aim to investigate whether BI is a feasible method for reducing CNSDs among older adults.

Method: Five older adults with previous overuse of z-hypnotics were invited. Two medical doctors performed the BI which assessed individual severity of dependence (SDS score) followed by a discussion of individual risk of overuse. The patient made a plan to reduce their z-hypnotics. Follow-up was after six weeks. Data collected consisted of self-reported quantitative and qualitative measures. Main outcomes were feasibility of the intervention and patients experience.

Results: 4/5 patients reported using z-hypnotics > 6 days/week before intervention. Median SDS score was 5/15. Immediately after the intervention, the patient expectations and belief in their own ability to reduce varied greatly. The average time of the brief intervention consultation was 15 minutes. The intervention was easier to perform in an office setting compared to bedside. All five patients, whether with positive expectations or not, were open and positive towards participating in the brief intervention conversation. Further descriptive qualitative data will be presented.

Conclusion: The results from this pilot study will assist in constructing the optimal design for a full scale RCT of brief intervention for reducing CNSD overuse in the older adult.

Ethical approval: Regional Committees for Medical and Health Research Ethics [2016/2289].

Trial registration: NCT03162081, 22 May 2017.

Keywords:

Prescription medication overuse; medication misuse; central nervous system depressing medication; z-drugs

Bjelkarøy MT, Cheng S, Siddiqui TG, Benth JŠ, Grambaite R, Kristoffersen ES, Lundqvist C. The association between pain and central nervous system depressing medication among hospitalised Norwegian older adults. *Scand J Pain*. 2021 Dec 16. doi: 10.1515/sjpain-2021-0120. Epub ahead of print. PMID: 34913326.

Kristoffersen ES, Straand J, Vetvik KG, Benth JŠ, Russell MB, Lundqvist C. Brief intervention for medication-overuse headache in primary care. The BIMOH study: a double-blind pragmatic cluster randomised parallel controlled trial. *J Neurol Neurosurg Psychiatry*. 2015 May;86(5):505-12. doi: 10.1136/jnnp-2014-308548. Epub 2014 Aug 11. PMID: 25112307; PMCID: PMC4413802.

Patients value non-physical care: Perceptions of the quality of the therapeutic alliance in patients utilising remote consultations for chiropractic care

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Study Objectives: The use of remote or virtual consultations (RCs) in healthcare has been increasing with the advent of telephone and video technology. They are popular with patients and clinicians (1,2) and during the COVID-19 pandemic which precluded traditional chiropractic consultations, some in the profession have engaged with this approach to support patients. To our knowledge there are no previous research studies that assess therapeutic alliance (TA) and satisfaction of chiropractic patients post RCs. This study aimed to explore the satisfaction of patients of UK chiropractors with RCs during the COVID-19 pandemic (April 2020-July 2020) and explore aspects of the TA built between them and their chiropractors during RCs.

Methods and material: Patients of practicing chiropractors using RCs in the UK were sent an invitation to complete an online survey. This survey collected information on 1) patient demographics, 2) satisfaction with RCs, and relative to a previous face-to-face appointment, and 3) TA using a modified client version of the Working Alliance Inventory - Short Revised (WAI-SR) form (3). Descriptive and inferential statistics were used to explore frequencies and potential associations/differences within the data.

Results: Overall 112 UK chiropractic patients responded to this survey, most of which were female (61.6%). Most patients had seen a chiropractor before (60.7%) and just under half had previously seen the same chiropractor (47.3%). 93.8% of patients were either satisfied or very satisfied with their RC. For those who had seen a chiropractor for a face-to-face appointment at some point in the past, almost a third were either satisfied or very satisfied, the majority (55.2%) were neutral, and the smallest proportion (12.8%) were either dissatisfied or very dissatisfied with their RC compared to their last face-to-face appointment.

A large majority of patients rated each of the WAI items as either “Always” or “Very Often”, which indicates a strong positive TA with their chiropractor in all domain questions. Patients rated their alliance as very positive overall and very positive for the Goal, Task, and Bond subdomains. The Task subdomain was rated as lowest out of the three subdomains. The lower scoring domain questions were question 1 “As a result of the session(s) I am clearer as to how I might be able to change” and question 11 “My chiropractor and I have established a good understanding of the kind of changes that would be good for me”, and both questions are part of the Task subdomain. Patients who had seen the same chiropractor for their RC rated their alliance as higher than those who saw a different chiropractor to who they had seen previously.

Conclusion: This survey provides preliminary patient satisfaction and TA data on RCs delivered by UK chiropractors. Future research should continue to explore patient outcomes of RCs relative to face-to-face appointments, the aspects of these digital approaches that patients value the most, and how chiropractors could adapt their consultations to address patients’ needs in addition to face-to-face appointments.

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Kruse, C.S. et al., 2017. Telehealth and patient satisfaction: a systematic review and narrative analysis. *BMJ open*, 7(8), p.e016242.

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CLI-09

Corona and Manual Professions: the impact of the pandemic on chiropractors and naprapaths in Sweden

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Study Objective: To investigate the impact of the Covid-19 pandemic on Swedish manual professionals' work environment, health and economy.

Methods and material: A prospective observational cohort study. All potentially eligible manual therapists in Sweden were invited through personal emails and posts in social media. Inclusion criteria were: registered chiropractor or naprapath, belonging to a professional organization, age < 66 years, being clinically active (active in health promotion, prevention and/or treatment of individuals).

Digital questionnaires were sent to consenting participants in the autumn of 2020, and then after 3, 6 and 12 months. The questionnaires included questions on work environment (what changes were made in clinic procedures and patient handling), on physical and mental health and on the participants' financial situation (lay-offs, expected turnover) as a result of the Covid-19 pandemic. The study received ethical approval from the Swedish Ethical Review Authority.

Results: A total of 703 individuals were included (53.5 % of the source population). Baseline results indicate that work environment was impacted but that clinicians were able to adequately care for their patients. The manual therapists also stated that the pandemic influenced their physical health (21%) and psychological health (42%). 10% had had verified Covid-19 infection. Nearly half of the participants had to take short-time work allowance to compensate for losses endured, and 43% expected the revenue to decrease as a result of the pandemic. Follow-up data are not yet analysed, but results will be available by May 2022.

Conclusion: Manual therapists in Sweden considered the Covid-19 pandemic to impact their work environment, health and economy.

CLI-10

Capitellar osteochondritis dissecans in an elite pre-adolescent gymnast: a case report and overview

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² , ,

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Objective: Following sports injury, a timely and accurate diagnosis is important, so as to initiate appropriate care as soon as possible. This is perhaps even more paramount in pediatric athletic trauma, particularly during the pre-puberty through adolescent years of rapid skeletal growth. This paper presents the diagnosis and management of osteochondritis dissecans in its third most common location, the elbow, a presentation of which chiropractors should be aware, including the importance of timely diagnosis and appropriate treatment.

Clinical Features:

A 9-year-old elite gymnast presented to my chiropractic clinic with elbow pain and restricted range of motion following a fall during training. Following collaborative involvement, the diagnosis was eventually made as osteochondritis dissecans.

Intervention and Outcomes: The patient underwent successful arthroscopic surgery, in order to remove the osteochondral fragment, followed by a specific regimen of rehabilitation exercises, which helped to enhance and accelerate optimal healing for her return to athletic activity.

Conclusion: The case reminds the practicing chiropractor of the valuable role he/she can play in the collaborative management of pediatric sports trauma, particularly in diagnosis and post-surgical care. A literature review presents a synopsis of the reported clinical presentations, diagnostic assessment and therapeutic options for capitellar osteochondritis dissecans.

CLI-11

Breastfeeding outcomes after attending an interprofessional midwifery and chiropractic student-led clinic

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Study Objectives: Breastfeeding is well established to protect and promote the health of mother and baby, and is influenced by structural, settings, and individual factors (Victora et al., 2016). Individual factors shown to affect breastfeeding include maternal breastfeeding self-efficacy and infant feeding, crying, and sleeping behaviours (Rollins et al., 2016). An interprofessional student-led clinic in the UK combines midwifery and chiropractic care for mother-baby dyads with breastfeeding difficulties. The objectives of this study were to quantify the demographic profile of dyads attending the clinic and to obtain feeding outcomes at six and twelve weeks of age, after attending the clinic.

Methods and material: Mothers of infants aged ≤ 4 weeks completed questionnaires prior to their appointment in the Clinic, questionnaires included detailed demographic information, current feeding practices, and validated measures of mother and baby attributes known to influence breastfeeding (Breastfeeding Self-Efficacy Short Form H&H Lactation Scale, and UK Infant Questionnaire). Follow-up data were collected electronically when the baby was 6 and 12 weeks old. Descriptive statistics were used for demographic data, paired-samples *t*-tests were used to measure change in validated measures over the two time points.

Results: Fifty-four mothers agreed to participate and completed the first questionnaire, mothers were predominantly married or partnered (100%), white British (96%), had completed adult education (78%), 30 years of age or older (72%), and primiparous (61%). Fifty-nine per cent of mothers ($n=32$) completed the questionnaire at six weeks, 52% ($n=28$) completed at twelve weeks. At six weeks, 100% ($n=32$) of mothers continued to breastfeed, 68% ($n=21$) were solely breastfeeding, and 73% ($n=22$) achieved their feeding goal. At twelve weeks, 85% ($n=24$) of mothers continued to breastfeed, 68% ($n=19$) were solely breastfeeding, and 71% ($n=20$) achieved their feeding goal. All five items measuring breastfeeding self-efficacy improved statistically significantly between the initial questionnaire and at six and twelve weeks. All six items related to infant behaviours, including feeding, sleeping, and crying, also improved statistically significantly over the two time points, with the greatest *t*-score change seen in the feeding item of the UK Infant Questionnaire. In short written responses, mothers reported that time in the Clinic, caring and supportive staff, and expert breastfeeding support were the most valuable aspects of their experiences.

Conclusion: Limitations of this study include the drop-out rate at six and twelve weeks (41% and 48% respectively) and a lack of comparison group. Despite these limitations, this study provides support for the approach taken to breastfeeding support in this clinic, with mothers reporting a multitude of positive outcomes and statistically significant improvements in known determinants of breastfeeding. Breastfeeding rates at six and twelve weeks were higher than expected in the local population, despite complex challenges and multiple predictors of early cessation of breastfeeding. Future research in this Clinic should focus on improving follow-up completion, comparing the Clinic to other forms of breastfeeding support, and widening access to mothers and babies in most need of breastfeeding support.

Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krasevec, J., Murch, S., Sankar, M. J., Walker, N. and Rollins, N. C., 2016. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *The Lancet* [online], 387 (10017), 475-490.

Rollins, N. C., Bhandari, N., Hajeebhoy, N., Horton, S., Lutter, C. K., Martines, J. C., Piwoz, E. G., Richter, L. M. and Victora, C. G., 2016. Why invest, and what it will take to improve breastfeeding practices? *The Lancet* [online], 387 (10017), 491-504.

CLI-12

Value-based goals for people with back pain - Categorisation using ICF, SMART assessment and evaluation of goal achievement

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Study Objectives: Goal setting is found to be an essential part of a rehabilitation process and has been demonstrated to affect adherence to exercise and self-efficacy positively. GLA:D Back aims to support self-management through group education and supervised exercises. To get an in-depth understanding of the personal goals there is a need to categorise types of goals. This may be achieved by systematising the goals into groups according to The International Classification of Functioning, Disability and Health (ICF) framework. It is recommended to focus goal setting on behaviours related to Activity and Participation rather than Body Function goals, but little is known about types of goals in back pain treatment or if these are accomplished.

The purpose of the study was to describe personal goals set in GLA:D Back by linking the goals to the ICF, and make a qualitative assessment of their SMART (Specific, Measurable, Acceptable, Realistic and Time bound) adherence. Also, to investigate the self-reported goal accomplishment and to what extent it relates to improvement in widely used back pain outcomes.

Methods and material: The study used data from the Danish and Canadian GLA:D Back registries. The goals set in GLA:D Back were written text phrases that were classified in NVivo by two researchers and systematically reviewed. The goals were categorised into the five components of ICF using the ICF Linking Rules and their SMART adherence was assessed. The self-reported accomplishment of goals was assessed on a 0-10 scale and reported as median and the proportion of patients with a goal achievement above five. A Chi-Squared Test was used to analyse the association between achieving the goal and having a clinically relevant improvement in pain or function.

Results: 400 patients from the Danish GLA:D Back registry were randomly selected while 131 records from the Canadian registry were included. 87.0% of the Danish patients had registered a goal while 94.7% of the Canadian patients had registered a goal ($p=0.02$). 70.0% of the goals were classified as Activity goals. No difference between the proportion of ICF components for the Danish and Canadian population were found ($p=0.44$). Below 10.0% of the goals were assessed to meet all the SMART criteria with no significant difference between Denmark and Canada ($p=0.91$). 71.0% of the Danish patients and 64.8% of the Canadian patients had a goal achievement above five while the median accomplishment was eight and seven for Danish and Canadian patients respectively. Goal accomplishment was associated with clinically relevant improvement in pain or function ($p<0.01$), but 62% of those not improving on other outcomes achieved their goal and the opposite was true for 55%.

Conclusion: Goals set in GLA:D Back primarily follows the recommendation of being related to the Activity component of ICF. There was a high accomplishment of goal in GLA:D Back and it was found to be associated with an improvement in core outcome measures such as pain and disability without mirroring these. The SMART approach was found to lack details regarding the goal setting process.

CAS-01

Resolution of chronic symptoms after brain contusion using a multimodal functional neurology approach to neurorehabilitation: a case report

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Objectives: Chronic persisting symptoms after traumatic brain injury occur in 20-30% of patients. Here, a near- complete recovery, in a 26 year old male, with chronic symptoms after brain contusion, following a multimodal functional neurology approach to neurorehabilitation is described.

On holiday a 26 year old otherwise healthy male fell down the stairs, and was diagnosed by a neurologist, based on CT and MRI imaging, with cerebral contusion. Bilateral bleedings were noted in the frontobasal region and in the right temporal pole. Subcortical edema and left occipital fracture were present. On follow up consultation in the Netherlands a neurologist confirmed the diagnosis and a visit was made with a specialized rehabilitation doctor for advice.

Exactly 16 months after his injury he still suffered from fatigue, headaches, irritability and hypersensitivity. He was unable to work (fence construction) fulltime and needed to rest throughout the weekend in order to be able to work on Monday.

Methods: Neurological evaluation demonstrated the following dysfunctions: impaired eye convergence, impaired smooth pursuit eye movements, eye saccades could not be uncoupled from head saccades. Binocular Visual Assessment identified: inability to demonstrate image fusion, diplopia and fixation disparation. Decreased sensation to pinwheel in his left hand and left ophthalmic branch (v1) of the trigeminal nerve. Pupil responses quickly fatigued upon direct light exposure (< 1 sec of constriction). Sensory information processing was evaluated using standardized Interactive Metronome™ measurements and demonstrated poor timing skills. Cervical and thoracic joint dysfunctions and myofascial triggerpoints were noted. Other neurological findings were unremarkable.

Over an 11 month period (17 consultations) he followed a multimodal neurorehabilitation program. Interventions were initially manily home-based and started with vestibular rehabilitation, oculomotor exercises, and neuromuscular re-education of the left arm and leg.

When progress was evident we implemented a homebased oculomotor computer training program (HTS) and six 45 minute sessions of Interactive Metronome™ training. Cervical and thoracic manipulative therapy was only added when improvement in oculomotor skills was evident and neurological findings normalized.

Results: Patient reported 95% improvement in symptoms. His headaches subsided to once a month and only when fatigued. He was able to work fulltime and attend larger crowds (birth day parties) without recurrence of symptoms. Oculomotor skills improved: fusional ranges increased from 0 to 38 diopter (convergence) and from 0 to 17 diopter (divergence). Smooth pursuit eye and saccadic eye movements normalized. Interactive metronome scores demonstrated improvement in timing and motor control: 130ms to 46ms (error reduction of 65%).

Conclusion: A multimodal approach to neurorehabilitation based on subsystems dysfunctions has been proposed for post-concussion care for the last 7 years. Throughout the course of care this chronic brain contusion patient demonstrated large functional, quantifiable, and symptomatic improvements.

Ellis MJ, Leddy JJ, Willer B. Physiological, vestibulo-ocular and cervicogenic post-concussion disorders: an evidence-based classification system with directions for treatment. *Brain Inj.* 2015;29(2):238-48

CAS-02

Return to school after 4 years of absence: a functional neurology approach to neurorehabilitation for post-concussion syndrome: a case report

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Objectives: Pediatric concussion can have devastating effects due to its influence on the developing brain. Upper-level neurocognitive deficits associated with concussion may, in part, result from less efficient downstream sensory integration. Here we demonstrate a reduction in post-concussive symptomatology, improvement in neurological functions and return to school after 4 years of absence, in a 14 year old boy following a functional neurology approach to neurorehabilitation.

A 14 year old boy suffered a concussion at the age of 10 on school camp. Initial care was delayed as his parents were not informed about the injury, and symptoms progressed into a chronic post-concussion syndrome. School attendance became impossible due to hypersensitivity for environmental stimuli, and he was homeschooled for four years.

Despite consultation with psychologists, rehabilitation doctors and physiotherapists throughout these 4 years he was unable to recover and return to school. MRI and EEG evaluation were negative for pathology. Ultimately, he was diagnosed with social anxiety disorder.

Methods: Based on his neurological dysfunctions an intensive multimodal neurological rehabilitation (IMNR) program was implemented on 28 June 2021. During 5 consecutive days, daily in clinic multimodal neurorehabilitation (9:00 – 15:00), involved a gradual, yet rapid buildup of workload. Multimodal treatment interventions included: cardiovascular exercises, vestibular rehabilitation therapy, oculomotor training, trigeminal nerve stimulation, timing and coordination training (Interactive Metronome™), flash light based reflex training (Blazepod) and cognitive training (Lumosity).

He was instructed to continue with physical home exercises and advice to gradually enhance his exposure to everyday stimuli. He visited our clinic one more time, on 28 July, after which contact was by phone only, as he appeared to progress well. The main goal was to have him back in school in January 2022.

Results: On intake he demonstrated the following dysfunctions: convergence insufficiency (Binocular Visual Assessment), timing (Interactive Metronome™), balance, left sided dysdiadochokinesia and rapid fatigue of pupil response to light (< 1 second of maintained constriction).

Objectively, he improved strongly in convergence eye movements (300% increase from 12 diopter to 48 diopter) and in Interactive Metronome scores (error reduction of 74%, from 116 ms to 31 ms). His pupil responses, balance and left sided coordination normalized.

Subjectively, he noted progression in strength, attention and self-confidence. Most importantly, he was able to return to school in October 2021. In January 2022 he was still fulltime in school with the exception of gym classes.

Conclusions: Upper-level neurocognitive deficits associated with concussion may, in part, result from less efficient downstream sensory processing. A 14 year old boy, otherwise therapy resistant, following a 5 day neurorehabilitation program demonstrated normalization of neurological dysfunctions normalized and resolution of symptoms. This resulted in a remarkable return to school after four years of absence.

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Ellis MJ, Leddy JJ, Willer B. Physiological, vestibulo-ocular and cervicogenic post-concussion disorders: an evidence-based classification system with directions for treatment. *Brain Inj*. 2015;29(2):238-48

Moore RD, Broglio SP, Hillman CH. Sport-related concussion and sensory function in young adults. *J Athl Train*. 2014;49(1):36-41

CAS-03

Return to sport after multimodal neurorehabilitation for persistent post concussive symptoms in a professional female soccer player; a case report

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Objective: To demonstrate decreased post-concussive symptomatology in a professional female soccer player following a functional neurology approach to multimodal neurorehabilitation.

Methods: A growing concern about the prevalence and severity of concussion in professional female soccer rises. Heading the ball is a frequent precipitating event. The importance of multidisciplinary approach has been proposed for some years already. Clinically, many symptoms of PCS appear reflective of different sub-system dysfunctions or point to co-existing neurological conditions that are multi-factorial in etiology. However, little guidance has been provided beyond recommending a multimodal approach yet.

This case report describes the clinical subjective and objective findings and measurements before and after treatment. The subject reported a hit from a ball to the head without seeing it coming. Direct after the incident, the patient was dazed and confused with headaches but she did not lose consciousness. She also mentioned an increased sensitivity to sound and light. She remained her hypersensitivity, dizziness, neck pain, headaches and 'brain fog' especially after sport-specific exercise. Looking at computers provoked headaches. Primary examination took place 11 months after the incident. Physiotherapy treatments to the cervical spine and mild exertional exercises were applied in the first 11 months after the incident. The intensity of her complaints were such that she has been unable to perform on the soccer field.

The subject was treated and trained with home eye-exercises, vestibular exercises, sport specific stability exercises and mild symptom-limited exertional cardiovascular activities: home trainer, treadmill and in later stage running. Oculomotor and vestibular exercises were applied daily, whilst sport specific exercises were performed 5x per week for 3.5 months. Cervical and thoracic manipulative therapy with soft tissue techniques were applied 6x within the timeframe of those 3.5 months.

Results: Baseline testing revealed the following results; saccadic latencies of 267 milliseconds to the left and 298 milliseconds to the right; binocular convergence-divergence testing showed a score of 23 diopters for divergence and 6 diopters for convergence; sensory processing reaction time: 654 milliseconds and the King-Devick test was performed in 45 seconds. On discharge, 3.5 months after the initial consult saccadic latencies have reduced to 152 (43%) milliseconds to the left and 176 (41%) milliseconds to the right. Her binocular testing increased to 27 diopters for divergence and 46 diopters for convergence, whilst the sensory processing reaction time reduced to 322 milliseconds. The King Devick test took her 39 seconds.

Subjective improvements were mentioned in such a way that dizziness and brain fog, headaches after working at a computer, light and sound hypersensitivity also had disappeared. The medical staff of her sports club assessed her physical fitness good enough so she can return to her sport at a professional level.

Conclusion: These promising results should advocate for further investigation towards a multimodal functional neurological approach for post concussive complaints.

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BASIC SCIENCE

BSC-01

Change in gravity promotes a change in spinal motor control

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Objectives: Within a year following a space mission, astronauts have an increased risk of back pain or herniated discs. Several causes have been linked to this increased risk. One important cause might be an altered or disrupted motor control of the spine during and after the space mission. Spinal motor control is an essential stabilizing mechanism for human spinal function.

The aim of the current study was to determine the response of spinal motor control to microgravity, Moon, Mars, Earth and hypergravity.

Methods: During two parabolic flight campaigns of the European Space Agency, measurements were carried out under Earth, Moon, Mars and hypergravity. Spinal motor control was recorded by the proxy measures spinal stiffness of lumbar L3 vertebra using impulse response.

Results: The mean age of the six female and six male subjects was 33 years (SD = 7 years). The Kruskal-Wallis test showed a statistically significant effect of the different gravity conditions on the stiffness of the spine ($p < 0.001$). The post-hoc analysis revealed a significant increase in stiffness in microgravity, lunar gravity and Martian gravity ($p < 0.001$). Both measurements in hypergravity (p 's ≤ 0.001) showed a lower spine stiffness compared to Earth gravity.

Conclusion: Changes in gravitational loading demonstrated a rapidly modulate of spinal stiffness. Lunar and Mars and microgravity conditions seem to provoke the same spinal motor control strategies. The decrease in spinal stiffness during hypergravity can be interpreted as a shift of the axial load from the spine to the pelvis and thoracic cage.

BSC-02

Reliability of an electrical stimulation paradigm to induce location-specific input from deep and superficial primary afferents of spinal tissue

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Objectives: To promote targeted treatments, the mechanisms underlying low back pain (LBP) need be better understood. Nociceptive fibers in deep spinal tissues may contribute to the pathophysiology of LBP (1,2). There also is evidence that nociceptive information from muscle and skin might be processed

differently at the spinal level; in preclinical studies, activation of nociceptors in deep tissue has been shown to result in longer lasting and increased activation of second order neurons in the dorsal horn than activation of cutaneous nociceptors (3). Yet in experimental pain research, primary afferent fibers from deep tissues are rarely investigated as opposed to superficial afferents.

This study aimed at developing a methodological approach for stimulating deep soft tissue afferents (non-nociceptive and nociceptive), exclusively. Our goal was to test the reliability of an experimental paradigm employed at superficial or deep primary afferents in spinal tissue.

Methods: 20 healthy volunteers underwent two visits separated by 28 +/- 5 days. Two isolated monopolar needle electrodes (Neurolite AG, Belp, Switzerland) were placed bilaterally either in the erector spinae muscles or overlying superficial skin at lumbar level L4-5 with a standardized distance of 10 mm between the needle tips. Electrical stimulations were performed using a Dantec Keypoint Focus System (Natus Neurology Incorporated, Wisconsin, USA).

The electrical detection (EDT) and pain thresholds (EPT) for each stimulation site were determined using a modified method of limits approach by calculating the geometric means of five series of ascending and descending stimulus intensities. Each staircase consisted of a series of single rectangular electrical impulses of 0.04 ms duration with an inter-stimulus interval of 3–5 s. Further, to compare the respective reliability to that of established quantitative sensory testing (QST) paradigms, mechanical detection (MDT), mechanical pain thresholds (MPT), and pressure pain thresholds (PPT) were determined (4). All measurements were performed twice during each visit to determine short-term reliability in addition to medium-term reliability at 28 +/- 5 days.

To investigate short and long-term reliability of EDTs/EPTs and MDTs/MPTs/PPTs, differences between measurements, intraclass correlation coefficients (ICCs), Bland–Altman plots (limits of agreement), and standard error of measurement (SEM) were calculated. ICCs were obtained using a single measure, consistency, 2-way mixed effect model (ICC3,1) and interpreted as >0.75 excellent reliability, 0.60 to 0.75 good reliability, 0.40 to 0.59 fair reliability, and <0.40 poor reliability (5).

Results: Preliminary analysis of eight complete data sets showed good-to-excellent short-term reliability for all modalities (ICCs: 0.61-0.93). Medium-term reliability was fair-excellent for mechanical stimulations (ICCs: 0.52-0.81) and poor for electrical stimulations (ICCs: 0.0-0.1). Data analysis will be completed by 02/2022.

Conclusion: Electrical stimulation showed equivalent short-term reliability to established QST modalities. Medium-term reliability could not be established, which may be due to slightly different positioning of the needle tips within the tissue. Despite this limitation, electrical stimulation has the advantage to allow location-specific and selective activation of non-nociceptive and nociceptive deep primary afferents without concomitant activation of cutaneous fibers. A better understanding of the processing from deep afferents will help the investigation of their importance in LBP.

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EDU-01

Impacts of the Covid-19 pandemic to the European Council on Chiropractic Education accredited programmes: Mixed methods audit and thematic analysis

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Objectives: The objectives of this study were to 1) determine the impact of Covid-19 on the operations within the 9 sections of the European Council on Chiropractic Education (ECCE) 'Standards'; 2) identify specific rapid changes to the programmes, and 3) identify positive changes that will continue post-pandemic.¹⁻⁵

Methods: This was a mixed methods audit and thematic analysis of data from interviews conducted via Zoom with programme leaders of the ECCE accredited institutions. A validated questionnaire designed around ECCE's 'Standards' was used consisting of 3 sections: 1. Severity of Covid-19's impact on each ECCE Standard section; 2. Description of programme changes made for each section; 3. Identification of positive changes continuing post pandemic. Descriptive statistics were calculated for Part 1 and their means compared for significant differences via the Kruskal-Wallis test. Verbal responses to Parts 2 and 3 were evaluated independently by three researchers using a modified 'thematic analysis' approach. Final thematic categories and themes were then agreed by the researchers.

Results: There was a 100% response rate. 'Outpatient teaching clinics' were most severely affected, followed by 'teaching chiropractic technique courses'.^{2,5} 'Curricular Structure and Duration' and 'Programme Management' were least affected ($p = 0.033$). Four thematic categories were identified: 'Extreme Stress', 'Courses Most Severely Affected', 'Integrity of Examinations and Assessments' and 'Positive Changes that will Continue'.⁵

Conclusion: Final year students were most negatively impacted due to restricted opportunities in outpatient clinics.^{2,5} The integrity of examinations was also a problem. Positive, innovative teaching materials and methods were quickly developed and should continue to be used post-pandemic.⁵

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The Feeding Clinic: a case for interprofessional student-led clinics

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Study Objectives: Interprofessional education and collaborative practice provide multiple opportunities and benefits to patients, healthcare workers, and healthcare systems (World Health Organization, 2010). In contrast to other allied professions, interprofessional and collaborative practice are not currently requirements of chiropractic education in the UK.

This study was set in an interprofessional student-led breastfeeding Clinic, which provided collaborative care to mothers and babies with breastfeeding difficulties. Student midwives and student chiropractors provided care under supervision of their respective registered lecturer-clinicians. The aim of this study was to explore students' experiences and early-career practitioners' reflections of the Clinic, particularly around their learning and practice.

Methods and material: This study was part of a pragmatic, mixed-methods study undertaken for doctoral research. Qualitative methods were used to explore students' experiences and early-career practitioners' reflections of the Clinic. Thirty-two students participated in seven focus groups, and seven former students were interviewed. Thematic analysis was used to analyse the data.

Results: Students found their time in the Clinic beneficial for learning about breastfeeding, supporting breastfeeding, and working collaboratively to support breastfeeding. Support from peers and supervising clinicians was facilitative of autonomous practice and made the Clinic enjoyable for students. Students felt better equipped to work collaboratively, including enhanced interprofessional communication skills. Challenges were raised, most of which centred around a lack of clarity of professional roles and practice, and lack of relationship with the other student they were working with. These were not seen as impassable barriers, and students proposed simple strategies to overcome these challenges.

Early-career midwives and chiropractors reflected on their experiences of the Clinic and how these had translated to post-registration practice. The Clinic culture and approach was central to discussions, with patient-centred care, continuity of care, time, and interprofessional problem solving being central pillars of the 'gold standard' care provided in the Clinic. As students, they learnt by observing and 'doing' in the Clinic, gaining confidence in their own abilities and the interprofessional Clinic approach. 'Seeing it work' was important validation and gave them a sense of reward. In terms of application of learning from the Clinic to practice, midwives and chiropractors described using the knowledge gained in the Clinic in very different practice settings. Both professions found the confidence gained in the Clinic useful in practice, including confidence in communication about breastfeeding.

Conclusion: Student and early-career midwives and chiropractors obtained valuable learning in the Clinic, particularly in collaborative practice and breastfeeding support. The interprofessional nature of the Clinic offered opportunities for students to develop the knowledge, skills, and communication to provide breastfeeding support, whilst the student-led element facilitated development of autonomous practice in a safe and supportive environment. Interprofessional student-led clinics could provide a multiple-benefit strategy to equip future chiropractors for interprofessional, collaborative practice, and creative use of such clinics should be explored by institutions.

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OTH-01

Research on research: the global chiropractic research enterprise initiative – preliminary analyses

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Study Objectives: The purpose of this study is to analyze the global chiropractic research enterprise, characterizing the output associated with particular institutions and countries, and identifying drivers of output, including successful institutional behaviours.

Methods and material: To date, records of research publications have been submitted to this project by 19 collaborating institutions. These have been supplemented by searches, based on institutional affiliation and researcher names, of PubMed, Europe PMC and Web of Science. Depending upon the particular analysis to be performed, for example co-authorship, co-citation or text analysis, up to 3,500 records have been analyzed using the lexical analysis application WordSmith Tools V8, or the network analysis applications Gephi 0.9.2 and VosViewer 1.6.18. Qualitative outcomes include various visualizations of networks, and quantitative measures, including bibliometrics, such as publication and citation counts, and measures of collaborative behaviours, such as network centrality.

Results: Quantitative and qualitative measures of research output vary widely by institution and country. For example, Denmark seems to have strength in electrodiagnostics, while Canada is over-represented in the publication of reviews and practice guidelines. Additionally, chiropractic educational institutions seem to be naturally parsed into those with relatively high and low publication output. Even educational institutions with similar numbers of students may differ by an order of magnitude in numbers of publications. Higher publication numbers and higher rates of citation are associated with more diverse networks, that is to say more collaborative behaviours involving chiropractic institutions, hospitals, universities, research institutions and private practitioners.

Conclusion: Understanding the global chiropractic research enterprise requires the use of diverse analytical tools in order to triangulate the place and trajectory of each stakeholder within the research ecosystem. Conventional bibliometrics, such as publication numbers, by themselves provide a very one-dimensional view of research output. Independent of inputs such as physical infrastructure and financial support, modulation of institutional behaviours would seem to have the most immediate and substantive impacts on research productivity.

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OTH-02

A survey of attitudes and beliefs of chiropractors in the Netherlands and Belgium and their possible association on guideline adherence

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Objectives: 1) To assess the attitudes and beliefs towards the management of low back pain (LBP) of Dutch and Belgian chiropractors; and 2) to investigate the association of these on the use of diagnostic imaging and on the adherence to recommendations of guidelines in the management of patients with LBP.

Methods: Study design: cross-sectional study using a web-based survey in chiropractic private practice in the Netherlands and Belgium. The survey requested information on personal and practice characteristics, use of diagnostic imaging, Pain Attitude and Beliefs Scale-Physiotherapists (PABS-PT) questionnaire and included 6 vignettes based on 3 acute and 3 chronic LBP patients. Using latent profile analysis, we categorized the chiropractors into clusters depending on their scores on the biomedical and biopsychosocial subscales of the PABS-PT. We used linear, logistic, and mixed models to examine the associations between these clusters and use of diagnostic imaging, management of patients with LBP and adherence to the recommendations of guidelines.

Results: The response rate of the Dutch chiropractors and Belgian chiropractors was (n=149/245) 61% and (n= 54/95) 57%, respectively. All questionnaires without missings were included for further analysis (n=158). Three clusters were identified, 1) high biomedical, low biopsychosocial group (n=18), 2) mid-biomedical, mid biopsychosocial group (n=117) and 3) low biomedical, high biopsychosocial group (n=23).

Responders in the low biomedical, high biopsychosocial group were slightly older (47.9 years, SD: 16.3), practiced longer (22.0 years, SD: 15.2) and more worked in Belgium (65.2%) compared to the other two groups.

LBP guidelines consisted of three elements, 1) return-to-work, 2) activity and 3) treatment. Results from the vignettes suggest that chiropractors in the high biomedical, low biopsychosocial group better adhere to diagnostic imaging guidelines and to LBP guidelines when it concerns advice on return-to-work and activity compared to the other two groups, however there are no clear differences between the groups for treatment of LBP.

The low biomedical, high biopsychosocial group indicated that they were less familiar with LBP management guidelines, and were more likely to request diagnostic imaging than the other groups.

Conclusion

In contrast to our prior hypothesis, the high biomedical, low biopsychosocial group demonstrated better overall adherence to the practice guidelines for the management of LBP and diagnostic imaging. These results might be explained by the fact that most participants were assigned to the mid biomedical, mid biopsychosocial cluster, which leaves limited discriminative ability. Furthermore, selection bias may play a role in these results; that is, more research-oriented and therefore guideline-oriented chiropractors were possibly more likely to participate.

OTH-03

Investigating skills, attitudes and uptake of evidence-based practice among Norwegian chiropractors; a cross-sectional study

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Study Objectives: Evidence based practice (EBP) is integrating best research-based evidence when making decisions about health care. This study aimed to investigate the attitudes toward EBP, the perceived level of skills in EBP, and the ability to use EBP in clinical practice among Norwegian chiropractors.

Methods and material: Licensed Norwegian chiropractors (n=770) who were members of the Norwegian Chiropractic Association were invited to participate in an anonymous online EBP survey in the period September to November 2021. To assess chiropractors' skills and attitudes toward EBP, we used the Evidence-Based Practice Attitude and Utilization Survey (EBASE), a self-administered online instrument. The EBASE survey includes 7 parts addressing different EBP constructs, and demographic items. Three sub-scores for the constructs attitudes, skills and use of EBP were created. Descriptive statistics were used to report the response rate and demographic characteristics of the sample. Means, medians, and frequency distributions were calculated for all questions in the survey and for each of the 3 sub-scores. A higher sub-score indicates higher self-reported attitudes, skills levels and use of EBP.

Results: A total of 312 (41%) Norwegian chiropractors completed EBASE. There was no greater difference between female and male (56%) respondents, most respondents were between 30-50 years of age (70%) and had been in practice for more than 11 years (55%). Most chiropractors had favorable attitudes toward EBP and most agree that EBP is necessary in the practice of chiropractic. Regarding the use of EBP over the previous month, chiropractors rated that they are not confident in their own ability to use EBP in clinical practice. Almost all chiropractors considered themselves to have an average to somewhat advanced skill-level in EBP.

Conclusion: The main findings of the study were that chiropractors in Norway are positive towards EBP and agree that clinical practice based on research improves the quality of health services. However, the findings emphasized the need for further knowledge of the barriers and facilitators to improving EBP skills and the uptake of EBP in chiropractic education and continuing medical education programs.