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Gesundheit

MSc Physiotherapie

Abstractbooklet

Masterarbeiten

Sehr geehrte Leserin, sehr geehrter Leser

Auch der aktuelle Abstractband des Studiengangs MSc Physiotherapie zeigt eindrücklich die Bandbreite der Masterarbeiten, dieses Mal des Jahrgangs MSc2023.

Die Forschungsprojekte wurden in verschiedenen Forschungsteams durchgeführt, natürlich in der F&E Physiotherapie, aber auch in anderen Instituten des Departements Gesundheit und weiteren Departementen der ZHAW, aber auch in vielen anderen Settings: von der Entwicklung und Anwendung Künstlicher Intelligenz für Gesundheitsfragen am Idiap Research Institute in Martigny über Projekte zur Unfallprävention gemeinsam mit der BFU bis hin zu biomechanischen Untersuchungen im K-LAB der Universität Genf und der Genfer Universitätsspitäler.

Die Masterarbeiten sind ein grosses und manchmal herausforderndes Lernfeld: es geht darum, dass die Studierenden ihr methodisches Wissen und Können in einem realen wissenschaftlichen Projekt umsetzen. Mindestens ebenso sehr geht es aber auch darum, die Ansprüche an Fertigkeiten und Geschick im Projektmanagement, in der Kommunikation, in der Rekrutierung von Proband:innen oder bei technischen Problemen zu erfüllen. Und das mit gekonntem Zeitmanagement, um eine passende Balance zwischen ihrem Alltag als Studierende, berufstätigen Physiotherapeut:innen und Privatmenschen zu finden. Nun, die Studierenden haben all das geschafft und Sie können nun das Ergebnis, nämlich die Abstracts von methodisch vielfältigen und interessanten Masterarbeiten lesen.

Ein grosses Danke geht an alle Dozierenden und die Betreuenden der Masterarbeiten für ihre meist schon jahrelange Unterstützung des MSc Physiotherapie Studiengangs und der Studierenden.

Wir wünschen Ihnen viel Vergnügen bei der Lektüre!

Im Namen des ganzen Studiengangteams



Lea Hegglin, MSc
Verantwortliche Transfermodule
MSc in Physiotherapie



Prof. Dr. Karin Niedermann
Leiterin Studiengang
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Between avoidance and overdoing: Baseline activity patterns and their associations with pain and disability over time in individuals with acute Neck Pain

Background
Neck pain is a common complaint among healthcare practitioners. Although neck pain often resolves on its own, approximately 47 % of patients still report persistent pain and disability one year later. Activity patterns (avoidance, persistence, and pacing) are linked to cognitive-emotional processes and influence activities of daily living. The study aimed to determine whether activity patterns are associated with pain intensity and disability over one year.

Methods
146 participants with acute neck pain, aged 18–65, were recruited. The Activity Pattern Scale was used to assess the activity pattern; the numeric rating scale was used to report mean pain intensity for the present, the worst, and the average in the last two weeks; and the disability was assessed using the Neck Disability Index. Linear mixed models were fit to examine the associations between activity patterns and pain intensity and disability.

Results
Most participants showed a persistence pattern (68 %), followed by avoidance (20 %) and pacing (8 %). The study found no statistically significant associations between activity patterns and pain intensity or disability over one year in individuals with acute neck pain. However, descriptive trends suggested potential differences, particularly for persistence and pacing. When persistence was split into pain-contingent and task-contingent persistence, a slight, relevant difference was observed: individuals with task-contingent persistence reported less disability.

Conclusion
Activity patterns were not associated with pain intensity and disability over one year, although some trends were observed. Persistence was the most common pattern and may be relevant to understanding patient behavior in clinical decision-making. Further research is needed to clarify when APs begin to influence outcomes and which factors drive chronification.

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ChatGPT-5.2 and DeepSeek-V3.2 in German-Language Patient Education on Low Back Pain: An Evaluation Using Real-World Scenarios and User Prompts

Background
Chatbots are becoming increasingly important in patient education. Despite their extensive medical knowledge, hallucinations remain a major challenge. More complex clinical situations and non-English languages are still poorly researched. This study evaluated ChatGPT-5.2 and DeepSeek-V3.2 in German-language patient education using real-world low back pain scenarios and user-generated prompts.

Methods
Based on a survey and prompt engineering, four prompts were developed for each of five case studies using the «PromptWISE» concept. Chatbot responses were evaluated by two raters regarding information quality (DISCERN) and validity (Likert scale 1–5). Readability (Flesch Reading Ease) was examined as well as understandability and actionability using a survey of laypeople. Differences between chatbots were analyzed using paired Wilcoxon tests, and differences between the prompts and cases using Friedman tests. Associations between the variables were examined using Spearman correlations.

Results
Both ChatGPT and DeepSeek achieved moderate DISCERN and validity scores. No significant differences were found between chatbots and cases. However, the responses varied significantly depending on the prompt. A positive correlation was observed between DISCERN and validity, despite considerable variability. Readability corresponded to an average reading level, whereas understandability and actionability received high ratings.

Conclusion
ChatGPT-5.2 and DeepSeek-V3.2 show potential for patient education regarding low back pain. However, they currently should only be used in real-world situations as a supplement to professional clinical assessment and with structured, context-rich prompts. Further studies are needed to examine real-world user interactions and comparisons between the German and English languages.

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Zusammenhang von körperlicher Aktivität und Selbstwirksamkeit mit den Langzeitergebnissen von GLA:D® Schweiz Arthrose Teilnehmenden.

Hintergrund
Hüft- und Knieosteoarthrose sind häufige chronische muskuloskelettale Erkrankungen. Leitlinien empfehlen als Erstlinientherapie strukturierte Patient:innenedukation und Training. Good Life with osteoArthritis in Denmark (GLA:D®) ist ein evidenzbasiertes Programm zur Umsetzung der Leitlinien. Für GLA:D® Schweiz Arthrose sind Langzeitergebnisse über das 1-Jahres-Follow-up hinaus sowie potenzielle Zusammenhänge mit osteoarthrosebezogener Selbstwirksamkeit und körperlicher Aktivität bisher wenig untersucht. Ziel dieser Arbeit ist es, langfristige klinische Ergebnisse (Operationsstatus, Schmerzintensität, Funktionsfähigkeit, Lebensqualität und Schmerzmittelkonsum) zu beschreiben sowie die Zusammenhänge zwischen osteoarthrosebezogener Selbstwirksamkeit, körperlicher Aktivität und den Langzeitergebnissen zu analysieren.

Methode
Phase 1: Registerauswertung der klinischen Langzeitergebnisse in den 2- und 3-Jahres-Follow-ups (n = 1177). Phase 2: REDCap-Querschnittsbefragung nicht operierter deutsch-/französischsprachiger Teilnehmender (n = 136) zu osteoarthrosebezogener Selbstwirksamkeit und körperlicher Aktivität. Zusammenhänge wurden mittels Spearman-Korrelationen und multipler linearer Regression untersucht.

Resultate
Die Operationsrate seit Programmabschluss betrug im 2-Jahres-Follow-up 26 % und im 3-Jahres-Follow-up 31 %. Nicht operierte Teilnehmende berichteten überwiegend von niedriger Schmerzintensität, guter Funktionsfähigkeit und Lebensqualität sowie hoher osteoarthrosebezogener Selbstwirksamkeit und körperlicher Aktivität. In den multiplen Regressionsmodellen war die osteoarthrosebezogene Selbstwirksamkeit adjustiert für Alter, Geschlecht, betroffene Gelenkregion und Follow-up-Jahr mit geringerer Schmerzintensität ($\beta = -0.53$) sowie höherer Funktionsfähigkeit ($\beta = 3.6$) und Lebensqualität ($\beta = 4.05$) assoziiert. Für körperliche Aktivität zeigten sich keine konsistenten Zusammenhänge mit den klinischen Ergebnissen.

Schlussfolgerung
Die Ergebnisse sprechen für günstige Langzeitergebnisse bei nicht operierten Teilnehmenden. Selbstwirksamkeit erscheint als zentraler Faktor und sollte in konservativen Programmen gezielt adressiert werden. Operationsraten sind als kontextuelle Versorgungsindikatoren zu interpretieren.

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The Association between Resilience and Psychological Readiness to Return to Sport in Patients after Shoulder Instability Surgery

Background
Return to sport (RTS) after shoulder instability (SI) surgery remains suboptimal despite successful stabilization surgery. Increasing evidence suggests that psychological factors may play a critical role in RTS recovery outcomes. However, the influence of resilience has not been investigated in this population.

Purpose
To evaluate changes in resilience during the early postoperative period and to determine whether baseline resilience and its change are associated with psychological readiness to RTS and shoulder-related quality of life following SI surgery.

Methods
Patients undergoing surgical stabilization for SI at a single-center orthopedic clinic were included. Data were collected preoperatively and at 3 months postoperatively. Resilience was assessed using the Brief Resilience Scale (BRS), psychological readiness using the Shoulder Instability–Return to Sport after Injury Scale (SIRSI), and shoulder-related quality of life using the Western Ontario Shoulder Instability Index (WOSI). Intraindividual changes in resilience (ΔBRS) were calculated. Associations were analyzed using Spearman correlation and multivariable linear regression adjusted for sport-specific shoulder load.

Results
Thirty-nine patients (mean age, 29.95 ± 9.41 years) were included. Mean resilience scores did not change between baseline and 3 months (ΔBRS: 0.08 ± 0.55; $p = .281$). Higher baseline resilience was associated with greater psychological readiness to RTS at 3 months ($\rho = 0.37$, $p = .023$) and with better shoulder-related quality of life ($\rho = -0.39$, $p = .014$). In adjusted multivariable regression analyses, baseline resilience remained independently associated with both SIRSI ($B = 11.79$, $p = .005$) and WOSI outcomes ($B = -33.38$, $p < .001$). Changes in resilience were not related to SIRSI outcomes but remained associated with WOSI scores ($B = -32.57$, $p = .003$). Sport-specific shoulder load showed no association with either outcome.

Conclusion
Resilience remained stable during the early postoperative period but demonstrated associations with psychological readiness to RTS and shoulder-related quality of life. Baseline resilience may represent a potential clinically relevant factor for identifying patients at risk following SI surgery.

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Physical Activity Maintenance in Older Adults: The Maintainers' Perspectives and a Conceptual Model

Background
Physical activity (PA) is necessary for healthy aging, yet many older adults (≥ 65 years) do not meet recommended levels, and PA maintenance (PAM) is insufficiently understood. This study aims to identify factors underlying PAM in older adults and compare these with findings from younger adults.

Methods
A qualitative study using semi-structured interviews was conducted with physically active older adults. 11 participants were purposively sampled, and data were analyzed using an inductive reflexive thematic analysis to develop a conceptual model of PAM.

Results
The analysis identified four themes with 14 categories, which were integrated into 6 factors: social environment, identity and personal orientation, enjoyment, health and well-being outcomes, adaptation and life context, and health as a precondition for PA. Social and intrinsic factors were most prominent, whereas health-related aspects were described as outcomes and conditions for continued engagement. Overall, PAM is influenced by interrelated motivational, contextual, and health-related factors.

Conclusion
In older adults, PAM is experienced as relatively stable despite minor fluctuations. The findings extend existing models by emphasizing the principal roles of identity and personal orientation and of health and well-being outcomes, including the function of health as a precondition for PAM. These insights have implications for practice and informing future research, including model validation and longitudinal investigation.

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Deutsche Übersetzung der Lifestyle Medicine Health Behavior Scale: Überprüfung von Strukturvalidität und Reliabilität an einer Schweizer Stichprobe – eine Querschnittstudie

Hintergrund
Nichtübertragbare Erkrankungen (NCDs) verursachen weltweit eine wachsende Krankheitslast, die durch einen gesundheitsbewussten Lebensstil reduziert werden könnte. Validierte deutschsprachige Messinstrumente zur Erfassung lebensstilrelevanter Verhaltensweisen fehlen. Ziel waren die deutschsprachige Adaptation der Lifestyle Medicine Health Behavior Scale (LMHB) sowie die Überprüfung ihrer Strukturvalidität und Reliabilität in einer Schweizer Stichprobe.

Methode
Die Adaptation erfolgte in einem neunstufigen Prozess gemäss ITC-Guidelines und ISPOR-Richtlinien und umfasste die Vorwärts- und Rückübersetzung, ein Expertengremium sowie kognitive Interviews. Die LMHB wurde in einer Querschnittsstudie evaluiert. Die Strukturvalidität wurde mittels konfirmatorischer Faktorenanalyse (KFA) sowie anhand eines Replikationsmodells geprüft. Suchtmittelkonsum wurde nicht als latenter Faktor berücksichtigt. Als Mass der Reliabilität wurde die interne Konsistenz anhand des ordinalen Alphas berechnet.

Resultate
Die Analysen basierten auf N = 713 deutschsprachigen Schweizer Personen. Die KFA bestätigte die fünf-faktorielle Struktur mit gutem Modellfit (CFI = .968, TLI = .961, RMSEA = .043, SRMR = .039). Das Replikationsmodell zeigte eine akzeptable Passung (CFI = .947, RMSEA = .046). Vier Subskalen (soziale Verbundenheit, Stressmanagement, Ernährung und körperliche Aktivität) wiesen zufriedenstellende Reliabilitätswerte auf (α = .79–.90); Schlaf und Suchtmittelkonsum unterschritten den Schwellenwert (α = .67). Bei der Subskala körperliche Aktivität zeigte sich ein Heywood-Fall.

Diskussion/Schlussfolgerung
Die deutschsprachige LMHB weist eine gute faktorielle Validität und eine überwiegend akzeptable Reliabilität auf, mit Einschränkungen bei Schlaf, körperlicher Aktivität und Suchtmittelkonsum. Als einziges deutschsprachiges Instrument, das alle sechs Bereiche der Lebensstilmedizin erfasst, schliesst die LMHB eine Lücke. Nach weiterer Validierung besitzt sie das Potenzial, als Screening-Instrument die interprofessionelle Zusammenarbeit entlang des Gesundheitspfads von Menschen mit NCDs zu stärken.

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Machbarkeitsanalyse zur Anwendung eines Erhebungsinstruments für die Erfassung sturzrelevanter Baueigenschaften in privaten Wohnräumen – Untersuchung von Durchführbarkeit und Benutzerfreundlichkeit

Hintergrund
Stürze im häuslichen Umfeld stellen bei älteren Menschen ein relevantes Gesundheitsrisiko dar. Trotz empfohlener Wohnraumanpassungen fehlen praktikable Verfahren zur Erfassung baulicher Risikofaktoren. Ziel war die Untersuchung der Machbarkeit eines von der Beratungsstelle für Unfallverhütung (BFU) entwickelten Erhebungsinstruments.

Methode
In einer quantitativen Machbarkeitsstudie wurden 30 Wohnungen in der deutschsprachigen Schweiz untersucht. Die Durchführbarkeit wurde anhand von Rekrutierung, Drop-out-Rate und Erhebungsdauer beurteilt. Die Benutzerfreundlichkeit wurde mittels System Usability Scale (SUS) bewertet. Zudem wurde die Übereinstimmung zwischen subjektiven Einschätzungen und objektiven Messungen der Rutschhemmung mittels Gwet-Koeffizienten analysiert.

Ergebnisse
Die Stichprobengrösse wurde erreicht. Von 38 Rückmeldungen konnten 30 Erhebungen durchgeführt werden; die Drop-out-Rate betrug 21,1 %. Die durchschnittliche Erhebungsdauer lag bei 51,4 ± 6,4 Minuten, der Median bei 50 Minuten (IQR: 46–55 Minuten). Erhebungen im Zweierteam waren kürzer als Einzelmessungen. Die SUS-Werte lagen zwischen 63,13 und 66,85 Punkten. Die Gwet-Koeffizienten lagen zwischen 0,03 und 0,60.

Diskussion/Schlussfolgerung
Das Erhebungsinstrument erwies sich unter praxisnahen Bedingungen als grundsätzlich durchführbar. Optimierungsbedarf besteht hinsichtlich Benutzerfreundlichkeit sowie zeitlichem und organisatorischem Aufwand. Objektive Messungen der Rutschhemmung erschienen trotz erhöhtem Aufwand sinnvoll, da subjektive Einschätzungen nur begrenzt mit instrumentellen Messwerten übereinstimmten. Die Ergebnisse bilden eine Grundlage für die Weiterentwicklung des Instruments.

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Discriminative validity of the calf raise test in patients with lateral ankle sprain

Background
The calf raise test (CRT) is commonly used and recommended during rehabilitation after lateral ankle sprain (LAS), but its discriminative validity has not yet been investigated in this population.

Objective
To investigate the discriminative (known-group) validity of an app-based CRT in distinguishing between patients with LAS and healthy controls, and its ability to detect inter-limb asymmetries.

Methods
A cross-sectional observational study with single-session data collection was conducted, including 20 healthy controls and 20 patients with LAS (4–16 weeks post-injury). The primary outcome was the number of repetitions (n), while secondary outcomes included total positive work (J) and total positive vertical displacement (cm).

Results
Patients completed fewer repetitions than healthy controls (median [IQR]: 21.5 [12.0] vs 29.5 [7.5], p = 0.024; AUC = 0.71), whereas total positive work (mean ± SD: 1633 ± 431 vs 1444 ± 656 J, p = 0.249; AUC = 0.58) and total positive vertical displacement (232 ± 67.6 vs 193 ± 87.6 cm, p = 0.128; AUC = 0.67) did not differ between groups. No differences between injured and uninjured limbs were observed for any outcome (all p > 0.05). Median inter-limb asymmetry ranged from approximately 5 % to 8 % across outcomes in patients.

Conclusion
Repetition-based CRT performance shows acceptable discrimination (AUC = 0.71) between patients and healthy controls. The small magnitude of inter-limb asymmetry limits its applicability for within-subject assessment in rehabilitation. Further research is required to determine its clinical usefulness across rehabilitation stages.

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Validation and examination of the Test-Retest Reliability of the German version of the Wheelchair Users Shoulder Pain Index (WUSPI)

Background
Shoulder pain is a common complication in individuals with spinal cord injury, impairing mobility and independence. Wheelchair users are particularly vulnerable due to their reliance on the upper extremities for mobility and daily activities. The Wheelchair Users Shoulder Pain Index (WUSPI), the only wheelchair-specific patient related outcome measure (PROM), has not yet been validated in German. Therefore, this study aimed to assess the construct validity and test-retest reliability of the German WUSPI.

Methods
This monocentric study at the Swiss Paraplegic Centre in Nottwil (08/2025–03/2026) included German-speaking adult wheelchair users with at least two years of use. Construct validity was assessed by correlations with German versions of the Western Ontario Rotator Cuff Index (WORC), Oxford Shoulder Score (OSS), American Shoulder and Elbow Surgeons (ASES) questionnaire and the Numeric Rating Scale (NRS). Test-retest reliability was evaluated after two to four weeks. Statistics included Spearman correlations, Cronbach's alpha and intraclass correlation coefficients (ICC).

Results
Fifty participants were included. Test-retest reliability was excellent (ICC = 0.97). Cronbach's alpha was 0.97 (95 % CI [0.96, 0.98]). The WUSPI showed moderate to strong negative correlations with WORC (rs = −0.744), ASES (rs = −0.685) and OSS (rs = −0.841) and strong positive correlation with NRS (rs = 0.857). All correlations were significant and partially consistent with a priori expectations for NRS and ASES.

Conclusion
The German WUSPI shows moderate to strong construct validity, high internal consistency and excellent test-retest reliability, supporting its use as a PROM for assessing shoulder pain among wheelchair users. However, sample heterogeneity and data variability at higher pain levels warrant caution interpretation.

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Perception and Educational Needs of Physiotherapy Students Regarding Person-Centered Communication: A Mixed-Methods Study

Background/Objective
Person-centered communication (PCC) is central to physiotherapy, yet clinical implementation remains challenging. While programs teach PCC theory, students' ability to accurately recognize these behaviors in practice, crucial for successful application, remains unclear. This study evaluated students' PCC recognition, explored reasons for rating behaviors, and identified educational needs.

Methods
In this explanatory sequential mixed-methods study, 27 undergraduate physiotherapy students (5th and 7th semester) evaluated eight PCC features across five video-recorded encounters. Student ratings were compared to an expert consensus using quadratic weighted Cohen's kappa, root mean square error, and bias. Subsequently, seven 7th semester students participated in semi-structured interviews, analyzed via qualitative content analysis, to explore their conceptualization of PCC, explain rating discrepancies, and identify clinical challenges and educational needs.

Results
Overall agreement was fair (median kappa = 0.250). Students accurately identified foundational skills like active listening but overestimated most features, notably shared decision-making (SDM) (bias = –1.45) and empowerment (bias = –0.55). Interviews revealed these discrepancies were driven by conceptual misunderstandings, equating SDM with basic consent and empowerment with patient compliance. Furthermore, students' rating behaviors were influenced by gut feelings, a halo effect, and a leniency bias.

Discussion/Conclusion
Physiotherapy students know the theoretical vocabulary for PCC but lack a deep conceptual understanding of complex features, struggling to evaluate them accurately in practice. Bridging this gap requires moving beyond theoretical lectures by integrating practical observation training and standardized checklists throughout the curriculum to teach students specific behavioral markers. Additionally, explicit, criteria-based feedback from trained supervisors during internships is essential.

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What barriers and facilitating factors do physiotherapists experience in outpatient physiotherapy when assessing the Physical Activity Vital Sign? A Mixed-Methods study.

Objective
Identifying barriers and facilitators for outpatient physiotherapists using the German Physical Activity Vital Sign (G-PAVS) to assess patients' physical activity (PA) levels.

Methods
This study used an explanatory sequential mixed-methods design. A quantitative survey assessed acceptability, appropriateness, feasibility, fidelity, penetration, and perceived integrability of the G-PAVS. Semi-structured interviews further explored barriers and facilitators in the use of the G-PAVS. Thirteen physiotherapists completed the survey and 11 participated in the follow-up interviews.

Results
Acceptability, appropriateness, and feasibility received positive ratings, with median scores of 4 or higher on a 5-point Likert scale. Fidelity showed two items scored < 3 and a median mean score of 3.25. Normalization potential was also rated positive with 15 of 17 items reaching scores of 4 or higher on a 5-point Likert scale. Qualitative findings identified time constraints, lack of routine, subjectivity of the answers, challenges in distinguishing moderate from vigorous activity, and patients' difficulties in answering the questions as key barriers. Facilitators included simple integration, good structuring of anamnesis interviews and its perceived value for chronic and non-specific conditions particularly for comparing with current recommendations.

Conclusions
The G-PAVS can be integrated into outpatient physiotherapy as a brief screening tool and was perceived as acceptable, appropriate, feasible, and supportive for structured PA assessment. However, routine implementation was limited by difficulties in activity classification, time constraints, and varying clinical relevance. Selective use appears most suitable in chronic, non-specific, or prevention-oriented conditions. Wider implementation requires structural support, simplified strategies for PA classification, and a formal validation of the G-PAVS.

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User-Centered Telerehabilitation for Chronic Low Back Pain. Development and Evaluation of Feasibility and Usability in a Sequential Exploratory Mixed-Methods Study.

Background
Low back pain (LBP) is a leading cause of disability worldwide. Telerehabilitation (TR) offers a flexible approach to supervised physical therapy by enabling location-independent access and reducing travel demands. Although TR is clinically viable for musculoskeletal conditions, implementation in Swiss outpatient physical therapy remains limited.

Objective
This study aimed to develop and evaluate a user-centered TR program for patients with chronic LBP in Switzerland and to assess its feasibility and usability in outpatient physical therapy.

Methods
A sequential exploratory mixed-methods design was used. In Phase 1, two focus group interviews with patients and physical therapists (n = 12) explored experiences and needs, related to TR using qualitative content analysis. In Phase 2, findings informed the development of a hybrid TR implementation concept, platform selection, and practical guides. In Phase 3, the TR program was evaluated in five patients with chronic LBP using validated implementation and usability questionnaires and descriptive process measures.

Results
Participants preferred hybrid care combining in-person and remote treatment. Real-time video therapy, individualized exercise guidance, and adaptation to the home environment were identified as central requirements for program development. Feasibility and usability testing showed high acceptability (AIM 4.9/5), appropriateness (IAM 4.6/5), feasibility (FIM 4.8/5), and usability (TUQ 6.5/7). Recruitment rate was 83 %, adherence was 100 %, and no major technical or organizational barriers were observed.

Conclusion
User-centered hybrid TR for chronic LBP can be feasibly implemented and delivered with high usability in Swiss outpatient physical therapy. Structured implementation processes, therapist communication skills, and shared decision-making appear central to successful delivery.

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Sonification and Verbal Encouragement: A Comparative Study Assessing the Impact on Affect and Test Performance during Cardiopulmonary Exercise Testing

Purpose
This study aimed to compare the effects of real-time auditory encouragement (sonification), standardized verbal encouragement, and no encouragement on physiological and psychological outcomes during cardiopulmonary exercise testing (CPET) in healthy non-athletes.

Methods
In a randomized crossover trial, 29 individuals not regularly engaged in structured physical activity (M = 27.9 ± 4.3 years; 11 female) completed three CPETs under different conditions: no encouragement (CC), standardized verbal encouragement (VC), and adaptive sonification (SC). Primary outcomes included maximal oxygen uptake (VO_2max), maximal power output (Wattmax), and time to exhaustion. Secondary outcomes were ratings of perceived exertion (RPE), affective valence (Feeling Scale), enjoyment (PACES), and attentional focus (TAM). Repeated-measures ANOVAs and ANCOVAs were performed for statistical analysis.

Results
VO_2max was significantly higher in the SC compared to both VC (Mdiff = 2.89 mL/kg/min, $p = .001$) and CC (Mdiff = 3.43 mL/kg/min, $p < .001$). Wattmax was also greater in the SC than in VC (Mdiff = 5.24 W, $p < .001$) and CC ($p = .006$). TAM scores were significantly higher in the SC compared to VC ($p = .034$) and CC ($p < .001$). No significant differences were observed between SC and VC for FS, RPE, or PACES.

Conclusions
Sonification enhanced physiological performance and attentional focus during CPET without increasing perceived exertion or altering affective responses. These findings support sonification as a promising, standardized strategy to promote effort and test engagement in physically inactive individuals.

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Increased physical activity and health literacy through counselling? The importance of physical activity counselling in people with axSpA from patients' perspective

Objectives
Physical Activity (PA) plays an important role in the management of axial spondyloarthritis (axSpA), yet many individuals experience difficulties engaging in PA. This study explored the perceived impact of PA counselling on PA engagement and on the perceived changes in the importance of PA in individuals with axSpA.

Methods
A qualitative design using Interpretative Phenomenological Analysis (IPA) was conducted. Semi-structured interviews were carried out with eight individuals with axSpA who had received PA counselling within the 'MyBeFit' programme. Data were analysed following the principles of IPA.

Results
Three group experiential themes (GETs) were identified. GET1: Enhancing understanding, confidence, and competence in PA through PA counselling described how PA counselling influenced the participants' understanding of and engagement in PA, GET2: Re-evaluating the meaning of PA in the context of the disease examined the participants' perceptions of PA and training and how these perceptions changed following diagnosis. GET3: Developing a competent and resource-oriented approach to PA explored the different aspects participants had to manage with PA integration.

Conclusion
PA counselling may represent a suitable intervention to support individuals with axSpA. Beyond increasing PA participation, it may also reduce uncertainty, enhance self-efficacy and support the development of a more confident and sustainable approach to PA engagement. Individualised counselling approaches may contribute to improved PA health literacy and long-term PA engagement despite fluctuating disease-related personal resources.

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Muscle Fatigue Responses to Differing Limb Occlusion pressures in Blood Flow Restriction Exercise
A crossover study with healthy individuals

Background
Blood-flow restriction training (BFRT) is effective, yet optimal individualised cuff pressure relative to limb occlusion pressure (LOP) remains unclear. Aim: To compare acute muscle fatigue and local oxygenation during unilateral leg-extension BFRT at 40 % versus 80 % LOP.

Methods
In this randomised crossover design, 25 healthy adults completed two visits with BFRT at 40 % (BFR40) or 80 % LOP (BFR80). Each session comprised four sets (30/15/15/15 reps) of unilateral leg extensions at 40 % 1RM with 60 s inter-set rest. Primary outcome: quadriceps superimposed maximal voluntary contraction (MVC) measured immediately before and after exercise. Secondary outcome: continuous vastus lateralis muscle oxygen saturation (SmO_2) via near-infrared spectroscopy (NIRS). Paired comparisons used 95 % confidence intervals.

Results
No between-condition difference in MVC change (BFR40–BFR80 = −0.38 Nm, 95 % CI −18.8 to 19.6, p = 0.968). MVC declined from pre-post in both conditions (BFR40 Δ = −46.1 Nm, 95 % CI −62.4 to −29.8; BFR80 Δ = −44.6 Nm, 95 % CI −61.4 to −27.9), indicating comparable immediate strength loss. SmO_2 responses differed: break-end SmO_2 was higher in BFR40 than BFR80 (Break 1: +6.36 percentage points, p = 0.0005; Break 2: +7.22 pp, p < 0.0001; Break 3: +7.44 pp, p < 0.0001), and reoxygenation slopes during breaks were faster in BFR40 (slope/10 s: Break 1: +1.39 pp, p = 0.029; Break 2: +1.77 pp, p = 0.006; Break 3: +1.65 pp, p = 0.010).

Conclusion
Individualised moderate and high BFRT pressures produced similar immediate reductions in MVC, 80 % LOP induced greater and more prolonged muscle deoxygenation between sets, whereas 40 % LOP allowed faster between-set reoxygenation, findings relevant to BFRT prescription.

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Exploring coping strategies and disease-specific quality of life in patients after surgery for shoulder instability

Background
Psychological factors, including coping strategies (CS), are increasingly recognised as relevant for recovery after musculoskeletal injuries. The influence of surgical stabilisations for shoulder instability (SI) on disease-specific quality of life (dsQoL) remains insufficiently understood.

Objective
To identify predominant CS and explore their association with dsQoL 12 weeks post-surgical stabilisation for SI.

Methods
This exploratory longitudinal cohort study included patients undergoing surgical stabilisation for SI at a single centre. CS were assessed preoperatively (baseline) and at 12-week follow-up using the Brief Coping Orientations to Problems Experienced (Brief COPE; scale 1–4; higher scores indicating more frequent use of CS). DsQoL was measured using the Western Ontario Shoulder Instability Index (WOSI; scale 0–210; higher scores indicating worse dsQoL). Changes over time were analysed using Wilcoxon signed-rank tests. Associations between baseline CS and 12-week WOSI were examined using adjusted linear regression models and linear mixed models.

Results
50 patients were included in the final analyses. WOSI improved from baseline to 12 weeks (MD –30.82, 95 % CI –40.72 to –20.91; Cohen's d –0.88). Adaptive CS predominated over maladaptive CS at both timepoints (baseline MD 1.11, 95 % CI 0.95 to 1.26, 12-week follow-up MD 0.99, 95 % CI 0.85 to 1.14). No meaningful associations were found between baseline CS and 12-week WOSI (adaptive β = –0.52, 95 % CI –19.78 to 18.74; maladaptive β = –13.75, 95 % CI –54.63 to 27.14). Analyses of individual CS showed weak and imprecise, with acceptance (β = –10.12, 95 % CI –21.39 to 1.16) suggesting a potentially beneficial association and self-distraction (β = 14.82, 95 % CI 4.31 to 25.33) and denial (β = 12.99, 95 % CI 0.93 to 25.05) indicating potentially unfavourable associations, though estimates remain uncertain.

Conclusion
In this cohort, preoperative CS showed no clear association with early postoperative dsQoL following surgical stabilisation for SI. Improvements in dsQoL appear to be primarily driven by other factors in the early rehabilitation phase. While certain coping patterns may still be clinically relevant, their role remains unclear and requires confirmation in larger studies with longer follow-up. Routine assessment of psychological factors may nevertheless support a more comprehensive rehabilitation approach.

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Effectiveness of pulmonary rehabilitation with integrated eccentric ergometer training versus standard pulmonary rehabilitation on maximal exercise capacity: a randomized controlled trial

Background
Exercise intolerance limits rehabilitation in many patients with cardiopulmonary disease. Eccentric cycling (ECC) may provide a higher mechanical stimulus at a lower cardiopulmonary cost than conventional concentric cycling. This study investigated whether implementing ECC to standard inpatient pulmonary rehabilitation improves maximal exercise capacity compared to standard care (SC).

Methods
This randomized controlled trial was conducted in a three-week inpatient pulmonary rehabilitation program in Switzerland. 22 participants with cardiopulmonary disease were randomly assigned to ECC (n = 11) or SC (n = 11). ECC was performed three times per week and implemented into usual rehabilitation. The primary outcome was peak work-rate during cardiopulmonary exercise testing. Secondary outcomes included peak oxygen uptake (peak VO_2), 6-minute walk distance, 1-minute sit-to-stand performance, dyspnea and leg fatigue. Linear mixed-effects models were used to estimate within-group changes and between-group differences over time.

Results
All 22 patients were included in the analysis. Both groups improved peak work-rate and peak VO_2, with no significant between-group differences (peak work-rate: –4 W, 95 % CI –17 to 9 W, p = 0.541; peak VO_2: 1 mL/kg/min, 95 % CI –2.4 to 2.6 mL/kg/min, p = 0.952). During rehabilitation, the ECC group increased 6-minute walk distance by 81 m compared to 29 m in the SC group, but the between-group difference of 51 m was not statistically significant (95 % CI –8 to 111 m, p = 0.108). No significant differences were observed for the 1-minute sit-to-stand test or symptom outcomes.

Conclusion
Implementing ECC to a three-week inpatient pulmonary rehabilitation program did not improve maximal exercise capacity compared with SC. However, the greater numerical improvement in 6-minute walk distance, which is far above the minimal clinical important difference suggests a potentially clinically relevant functional benefit that should be investigated in a larger, adequately powered trial.

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Prognostic Value of Baseline Clinical Assessments for Pain Intensity and Disability over a 12-Month Follow-Up in Non-Specific Neck Pain

Background
Non-specific neck pain (NSNP) is highly prevalent and associated with substantial pain and functional limitations. Clinical impairments in mobility, sensitivity and sensorimotor control are frequently demonstrable. However, longitudinal testing and prognostic evaluation beyond six months are scarce and inconsistent, leaving it unclear whether baseline clinical test performance predicts subsequent trajectories of pain intensity and pain-related disability.

Objective
To determine whether baseline performance on six clinical tests, range of motion, pinprick, joint position error, cervical movement sense, head–eye coordination, and cervical movement control, predicts 12-month trajectories of NSNP meas-ured by two outcomes.

Methods
Longitudinal observational cohort. A standardised six-test battery was ad-ministered in person at baseline; the baseline score of each test served as the predictor in separate linear mixed-effects models with a participant-specific random intercept. Outcomes were pain intensity (PainDETECT (PD-Q)) and pain-related disability (Neck Disability Index (NDI)) measured at baseline, 3, 6 and 12 months. Time was categorical and the baseline value of the outcome was included as a covariate. Primary inference evaluated whether trajectories differed by baseline impairment across all follow-ups (time × predictor). The analytic sample comprised participants with ≥ 1 follow-up for PD-Q or NDI (n = 138).

Results
Cohort means improved over 12 months (PD-Q –1.68, ≈ 34 %; NDI –6.42, ≈ 28 %). No baseline test showed a significant time × predictor interaction for PD-Q or NDI.

Conclusion
Baseline clinical test performance did not stratify 12-month pain intensity or pain-related disability trajectories. These measures support monitoring but have limited standalone prognostic utility; multifactorial risk models should be prioritised.

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Quality of life in adolescents with idiopathic scoliosis: A cross-sectional comparison

Background
Idiopathic scoliosis is a three-dimensional spinal curvature treated during adolescence with physiotherapy, braces or surgery. This can be stressful for patients. Few studies compare the quality of life of adolescents with and without scoliosis. Our study aims to investigate the quality of life of adolescents with and without scoliosis using the KID-SCREEN-27 questionnaire.

Method
This comparative cross-sectional study included 60 participants who answered KIDSCREEN-27 accompanied by questions about age, sport intensity and their school category. Girls between the ages of 12 and 17 were included in the study. For each category of KIDSCREEN-27, the values were compared between participants with and without scoliosis.

Results
Statistical analysis was done using R Version 4.3.3. In none of the categories were the mean T-scores of adolescents with scoliosis significantly lower than those of the comparison group. In the scoliosis group, 33 % (n = 10) showed values rated as 'low' quality of life in the category 'physical well-being'. In the category 'psychological well-being', 36 % (n = 11) showed 'low' values.

Conclusion
A general statement about the quality of life in adolescents with scoliosis cannot be made, but monitoring during treatment appears to be important. It is a complex construct that varies for each patient. KIDSCREEN-27 can quickly and easily identify low quality of life in patients with scoliosis.

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Das Rollenverständnis von Physiotherapeut:innen in der deutschsprachigen Schweiz hinsichtlich der Förderung körperlicher Aktivität – eine qualitative Studie

Hintergrund/Ziele
Körperliche Aktivität ist ein zentraler Bestandteil in der Prävention und Behandlung nichtübertragbarer Krankheiten. Physiotherapeut:innen bringen aufgrund ihrer Expertise in Bewegung und Training gute Voraussetzungen mit, körperliche Aktivität über therapeutische Behandlungsmassnahmen hinaus zu fördern. Unklar ist jedoch, inwieweit sie diese Aufgabe als Teil ihrer beruflichen Rolle verstehen und im Praxisalltag umsetzen. Ziel der Studie war die Untersuchung des Rollenverständnisses von Physiotherapeut:innen hinsichtlich der Förderung körperlicher Aktivität, deren praktischer Umsetzung sowie die Identifikation relevanter Barrieren und Förderfaktoren.

Methode
Es wurde ein qualitativ-deskriptives Studiendesign gewählt. Die Datenerhebung erfolgte mittels semistrukturierter, leitfadengestützter Interviews mit zehn ambulant tätigen Physiotherapeut:innen aus dem muskuloskelettalen Bereich der Schweiz sowie einer Vertreterin des Berufsverbands Physioswiss. Die durchschnittlich 60-minütigen Interviews wurden zwischen Oktober 2025 und März 2026 durchgeführt, transkribiert und anhand der inhaltlich strukturierenden qualitativen Inhaltsanalyse nach Kuckartz und Rädiker ausgewertet. Die Datenanalyse erfolgte mithilfe von MAXQDA 2024.

Ergebnisse
Physiotherapeut:innen verstehen die Förderung körperlicher Aktivität als Teil ihrer beruflichen Rolle, interpretieren deren Ausgestaltung jedoch unterschiedlich. Während einige diese primär beschwerdebezogen einordnen, vertreten andere ein erweitertes Rollenverständnis mit Fokus auf Prävention und langfristige Verhaltensänderung. Die Umsetzung erfolgt überwiegend patientenzentriert, kontextabhängig und unsystematisch und wird durch persönliche Überzeugungen, patientenseitige Erwartungen sowie strukturelle Rahmenbedingungen beeinflusst. Die berufspolitische Perspektive bestätigt das hohe Potenzial der Physiotherapie zur Förderung körperlicher Aktivität, verweist jedoch auf strukturelle und tarifarische Einschränkungen.

Diskussion/Schlussfolgerung
Die Förderung körperlicher Aktivität stellt ein relevantes, bislang jedoch nicht systematisch integriertes Handlungsfeld der Physiotherapie dar. Eine klarere Verankerung im beruflichen Rollenverständnis sowie entsprechende strukturelle Rahmenbedingungen könnten zu einer nachhaltigen Integration in die physiotherapeutische Versorgung beitragen.

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Reliability and validity of marker-based motion analysis in 3-month-old typically developing children – as part of BAMBI: neuro-Biomechanical Aspects determining the Motor Behavior in Infants with high-risk of neuromotor impairments

Background/Objective
Cerebral palsy describes the most frequent motor disability in children for which early detection provides an early diagnostic-specific intervention. Three-dimensional movement analysis permits to quantify infant movement repertoire. Therefore, we aimed to determine the construct validity and the intra-session reliability of marker-based analysis, in comparison to the clinical qualitative observation using the Motor-Optimality-Score-Revised (MOS-R) in 3-month-old children-developing-children.

Methods
3-month-old-typically-developing-children's spontaneous movements were recorded in two and three dimensions simultaneously, using reflective markers. Kinematic variables and distance indexes were computed. Validity analysis compared kinematic variables versus MOS-R movement character types, using Kruskal-Wallis (groups > 2) and Wilcoxon rank-sum (groups = 2) tests. Confusion matrices compared distance indexes versus MOS-R movement patterns. Reliability analysis was performed using ICC(2,1) and ICC(2,k) for both kinematic variables and distance indexes.

Results
Data of 19 children were used for validity and 17 for reliability. Clinical observation reported 4 movement character types and 4 movement patterns. Validity analysis showed no significant results (p-value < 0.05) for kinematic variable to detect changes between movement characters. For movement patterns, 84.2 % accuracy was found in hand-to-hand contacts. Reliability analysis demonstrated good ICC(2,k; 0.75–0.90) for 28 % of the kinematic variables, and in foot-to-foot distance index.

Discussion/Conclusion
Limited validity and reliability were found in the kinematic analysis in 3-month-old typically developing children. Further research is needed to determine if the kinematic variables are valid to discriminate typical development from neurodevelopmental disabilities. Robust data acquisition could significantly improve the ability to prove a valid and reliable marker-based motion analysis to quantify 3-month-old infants movement repertoire.

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German Post-Concussion Symptom Scale in mild traumatic brain injury: convergent validity and discriminative ability in a prospective cross-sectional study

Background/Objective
The diagnosis of mild traumatic brain injury (mTBI) is largely based on clinical assessment and patient-reported symptoms. The Post-Concussion Symptom Scale (PCSS) is widely used to assess current symptom burden. However, the psychometric properties of the German version remain insufficiently investigated. This study aimed to evaluate the convergent validity and discriminative ability of the German PCSS in individuals with and without mTBI.

Methods
In this monocenter prospective cross-sectional study, 126 participants were included (30 with mTBI, 96 controls). Convergent validity was assessed using Pearson correlations between the PCSS and established instruments (RPQ, PHQ-9, NDI) within the mTBI group. Discriminative ability was evaluated using receiver operating characteristic (ROC) analysis.

Results
The PCSS showed moderate correlations with the Rivermead Post-Concussion Questionnaire (RPQ) ($r = 0.64$), Patient Health Questionnaire-9 (PHQ-9) ($r = 0.51$), and Neck Disability Index (NDI) ($r = 0.35$). The correlation between PCSS and RPQ symptom count was $r = 0.57$. Receiver operating characteristic (ROC) analysis demonstrated excellent discriminative ability (area under the curve [AUC] = 0.93; 95 % CI: 0.88–0.99). A cutoff score of 17 yielded a sensitivity of 0.90 and a specificity of 0.82.

Discussion/Conclusion
These findings provide preliminary evidence regarding the convergent validity and discriminative ability of the German PCSS. However, convergent validity was only partially supported by the predefined hypotheses, and the proposed cutoff should be considered exploratory pending external validation. The instrument may support structured symptom assessment as part of clinical screening practice.

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Fear of falling before and after the GLA:D® programme: changes and associated predictors

Background
Fear of falling (FoF) is common among older adults and linked to reduced physical activity, functional decline, and increased fall risk. Risk factors for FoF, including pain and impaired physical function, are also common in individuals with hip or knee osteoarthritis. Although the Good Life with osteoArthritis in Denmark (GLA:D®) programme is associated with improvements in osteoarthritis-related outcomes, its effects on FoF remain unclear. This study examined changes in FoF following participation in the GLA:D® programme and explored factors associated with these changes.

Methods
This prospective, longitudinal observational study included participants with hip or knee osteoarthritis enrolled in the GLA:D® programme in the German-speaking region of Switzerland. FoF was assessed using the Falls Efficacy Scale-International (FES-I) at baseline and post-intervention. Changes in FoF were analysed using a paired t-test. Associations between changes in FoF and potential predictors were explored using multiple linear regression with exploratory model selection.

Results
Fifty-two participants (mean age 68.5 ± 7.9 years; 65 % female) were included. Mean FES-I score decreased by 1.8 points (95 % CI [−2.7, −0.9], $t(51) = -4.02$, $p < 0.001$). The association between changes in self-reported activities of daily living function and FoF was moderated by baseline FES-I score ($t(45) = -3.25$, $p = 0.002$) and body mass index ($t(45) = 2.13$, $p = 0.039$).

Conclusion
These findings suggest that perceived functional ability in daily activities may contribute to reductions in FoF. This highlights the potential importance of function-oriented rehabilitation approaches for individuals with hip or knee osteoarthritis.

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Der Einfluss von vibrotaktiler Stimulation auf die selbstgewählte Gehgeschwindigkeit bei Menschen mit Morbus Parkinson – Eine Pilotstudie

Hintergrund/Ziele
Vibrotaktile Stimulation stellt einen vielversprechenden Ansatz zur Beeinflussung der Gehgeschwindigkeit, dem sogenannten «6. Vitalzeichen», bei Menschen mit Morbus Parkinson dar. Ziel dieser Pilotstudie war es daher, den Einfluss einer schwungphasenabhängigen vibrotaktilen Stimulation mittels eines intelligenten Schuhs (NUSHU) auf die selbstgewählte Gehgeschwindigkeit zu untersuchen sowie ergänzend die Sicherheit und Benutzerfreundlichkeit des Systems zu evaluieren.

Methode
In einer randomisierten within-subject Crossover-Pilotstudie absolvierten 15 Personen mit Parkinson jeweils zwei 2-Minuten-Gehtests, einmal mit und einmal ohne aktivierte vibrotaktile Stimulation. Als primärer Endpunkt wurde die selbstgewählte Gehgeschwindigkeit untersucht, während Schrittlänge und Kadenz als sekundäre Endpunkte erfasst wurden. Ergänzend wurden explorativ weitere Gangparameter und Variabilitätsmasse zur Beurteilung der Gangregelmässigkeit analysiert. Die Sicherheit wurde durch standardisierte Beobachtung erhoben, die Benutzerfreundlichkeit mittels der deutschen Version der System Usability Scale (SUS-DE).

Resultate
Die vibrotaktile Stimulation führte zu keiner signifikanten Veränderung der Gehgeschwindigkeit ($p = 0{,}191$), Schrittlänge ($p = 0{,}381$) oder Kadenz ($p = 0{,}165$). Explorativ zeigten sich signifikante Reduktionen der Variabilität von Schrittlänge ($p = 0{,}006$), Schrittgeschwindigkeit ($p = 0{,}014$), Schrittdauer ($p = 0{,}014$) und Fussaufsatzwinkel ($p = 0{,}003$). Sicherheitsrelevante Ereignisse traten nicht auf. Die Benutzerfreundlichkeit war mit einem mittleren SUS-DE-Score von 90 Punkten hoch.

Diskussion/Schlussfolgerung
Die Ergebnisse zeigen keine Hinweise auf eine unmittelbare Beeinflussung der Gehgeschwindigkeit durch die angewendete Stimulation. Der mögliche Nutzen scheint eher in einer Reduktion der Gangvariabilität zu liegen, was für Menschen mit Parkinson allerdings ebenfalls klinisch bedeutsam sein kann, da eine höhere Variabilität mit erhöhter Sturzgefahr und Freezing of Gait in Verbindung steht. Aufgrund des Pilotcharakters sollten diese Befunde jedoch vorsichtig interpretiert und in grösseren, kontrollierten Studien überprüft werden.

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Effects of Movement Sonification on Quadriceps Activation, Vertical Ground Reaction Force, and Bilateral Symmetry During the Bodyweight Squat in Able-Bodied Adults

Background/Objective
Movement sonification translates kinematic parameters into auditory signals and may augment neuromuscular engagement without competing for attentional resources. Two acoustically distinct designs, tonal and noise-based sonification, may differ in their auditory-motor coupling mechanisms. This exploratory study examined the effects of four auditory conditions on quadriceps muscle activation, ground reaction force, and bilateral symmetry during the concentric phase of the bodyweight squat in able-bodied adults.

Methods
Twenty-two able-bodied, recreationally active adults performed bodyweight squats under four randomized, counterbalanced auditory conditions: no sound, metronome, tonal and noise-based sonification. Surface electromyography of the vastus medialis and lateralis served as the primary outcome. Peak vertical ground reaction force (vGRF), vGRF symmetry index, and the maximum knee flexion angle were secondary outcomes. A linear mixed model with Tukey-adjusted pairwise contrasts was used for the primary outcome.

Results
Both sonification conditions produced significantly higher quadriceps activation than No Sound (Stimulus Noise: $\Delta = 2.88\,\%$ MVC, $d = 0.37$; Stimulus Tonal: $\Delta = 2.41\,\%$ MVC, $d = 0.31$; both $p < .001$) and Metronome (both $p < .001$), with small effect sizes. No significant differences were found between sonification types, between No Sound and Metronome, or in any secondary outcome.

Discussion/Conclusion
Structural coupling between the auditory signal and the movement cycle, rather than the mere presence of sound, appears to drive quadriceps augmentation. The equivalent effect of both sonification designs suggests that acoustic character may be guided by participants' preference, provided structural coupling is maintained. These findings support movement sonification as a candidate tool for neuromuscular augmentation in squat-based rehabilitation, pending investigation in loaded and clinical populations.

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Effect on menstrual cycle phase on peroneus longus pre-activation during a standardised Pivot-Turn task in recreational athletes

Background/Objective
Lateral ankle sprains are among the most common injuries in female recreational athletes, with women facing a substantially higher risk than men. Hormonal fluctuations across the menstrual cycle may partly explain this disparity, as oestrogen enhances and progesterone attenuates neuromuscular excitability. This study examined whether peroneus longus pre-activation amplitude during a pivot-turn task differs across menstrual cycle (MC) phases in female recreational athletes.

Methods
38 female recreational athletes (age: 24.3 ± 2.8 years; Body Mass Index (BMI): 22.8 ± 2.2 kg/m^2, range: 19.3–28.1) were measured during menstruation, the late follicular, ovulatory, and luteal phases. Surface EMG activity of the peroneus longus was recorded during the 100 ms preceding initial contact (IC) with the force plate. Mean RMS amplitude was normalised to individual maximal voluntary contraction (MVC) and expressed as %MVC. Phase verification used urinary luteinising hormone (LH) testing, prospective cycle tracking, and gynaecological review. A linear mixed model (LMM) was used.

Results
No statistically significant differences in peroneus longus pre-activation were observed across cycle phases. Effect sizes were small for all pairwise comparisons. Between-participant differences accounted for approximately 36 % of total variance, while cycle phase explained less than 1 %. Residual standard deviation (SD) was approximately 16 % and the between subject SD approximately 12 %.

Discussion/Conclusion
The present findings do not support a systematic group-level effect of menstrual cycle phase on peroneus longus pre-activation. The wide confidence intervals indicate that substantial phase-related differences cannot be excluded.

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Associations of Disability with Body Perception and Insomnia in Patients with Chronic Nonspecific Low Back Pain

Background
The objective of this study was to analyse the association between disability, insomnia and body perception among patients with chronic nonspecific low back pain (CNLBP).

Methods
This cross-sectional observational study included 282 patients with CNLBP. Of these, 273 patients were retrospectively analysed from a cohort recruited in Sydney, Australia, and 9 patients were recruited prospectively in Zurich, Switzerland. Disability was assessed using the Roland Morris Disability Questionnaire (RMDQ), insomnia using the Insomnia Severity Index (ISI), and body perception using two-point discrimination (TPD). In addition, pain intensity using the Numeric Rating Scale (NRS), pain duration, age and sex were recorded. Pearson's correlation was used to examine relationships between variables. Univariate and multivariable linear regression models were fitted to assess associations between RMDQ, and both TPD and ISI.

Results
A moderate correlation was observed between disability and insomnia ($\rho = 0.40$). In contrast, the correlation between disability and body perception (TPD) was weak ($\rho = 0.11$). Multivariable linear regression models revealed a positive association between TPD and RMDQ ($p = 0.04$) and between ISI and RMDQ ($p < 0.001$). No interaction effect between ISI and TPD on RMDQ was found.

Conclusions
Insomnia (ISI) and body perception (TPD) seem to independently influence disability in patients with CNLBP. The effect of insomnia on disability observed in this study shows greater certainty than that of body perception.

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The Role of Perceived Group Allocation in Exercise Adherence: An Analysis of RCT Data in Low Back Pain

Background
Adherence is essential for interpreting treatment effects in randomized controlled trials (RCTs) with exercise interventions. Although perceived group allocation may affect participants' behaviour, its role in adherence remains unknown. Therefore, this study aimed (1) to investigate the agreement between participants' actual and perceived group allocation and (2) to examine differences in adherence according to perceived group allocation.

Methods
Data were derived from an RCT conducted at the University of Lucerne (May 2025-January 2026) in people with non-specific low back pain. Participants received either a personalized, clinical reasoning-based exercise program (intervention group) or a non-personalized standard exercise program (control group). Both groups trained for eight weeks, four sessions weekly. Actual allocation was obtained from the randomization list, perceived allocation after eight weeks via questionnaire. Adherence was assessed using training diaries. Agreement was analysed using Cohen's κ, and adherence differences using the Wilcoxon rank-sum test.

Results
Fifty-one participants were included (mean age: 37 years; mean RMDQ: 4.6/24). Forty-five participants (88 %) perceived themselves as belonging to the personalized group, six (12 %) to the non-personalized group. Agreement between actual and perceived group allocation was negligible (Cohen's $\kappa = 0.014$; 95 % CI −0.17 to 0.20). Participants perceiving themselves as being in the personalized group completed more training sessions (median: 25 vs 20 sessions; $p = 0.164$).

Conclusion
Minimal agreement between actual and perceived group allocation suggests successful blinding. Differences in adherence between perceived allocation groups were small. Nevertheless, perceived group allocation should be considered a potential source of performance bias in trials.

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Menstrual cycle phase effects on dynamic knee valgus during a unilateral drop jump in female recreational athletes and implications for ACL injury risk

Background/Objective
Women are 2–10 times more likely to suffer an ACL rupture than men in the same sport, with 70 % of injuries occurring without contact, during landing, rapid direction changes, or abrupt stops in stop-and-go sports. Dynamic valgus is a key risk factor, and due to sex hormone receptors in the ACL, female hormones may also play a role. This study examined the unilateral drop jump across the four menstrual cycle phases, recording kinematic variations in dynamic valgus between the dominant and non-dominant legs. H0 states that there is no meaningful difference in dynamic valgus (knee abduction, hip adduction, MKD) between the four phases of the menstrual cycle, while H1 states that dynamic valgus differs meaningfully in at least one phase compared to the other three.

Methods
36 female recreational stop-and-go athletes in Switzerland were recruited, of whom 33 were followed over two menstrual cycles, with the second being analysed. Each participant was measured four times across the relevant phases, performing the unilateral drop jump five times per leg. Hip adduction, knee abduction (both in °), and MKD (in mm) were recorded.

Results
No phase effect is observed in hip adduction and knee abduction. MKD shows a higher value during the menstrual phase. During the menstrual phase, 51.5 % (dominant) and 36.4 % (non-dominant) reach their MKD peak between initial contact and 100ms.

Conclusion
No clear phase effect is observable in hip adduction and knee abduction. There is a tendency towards increased MKD during the menstrual phase. Further research with larger sample size is needed to clarify the role of sex hormones and dynamic valgus.

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A reliability study of the point-to-point test among individuals with non-specific low back pain

Background
The point-to-point (PTP) test measures tactile acuity and could offer an alternative to two-point discrimination. Although its reliability has been examined in healthy individuals and in those with chronic non-specific low back pain (NSLBP), evidence regarding its use in people with acute NSLBP is limited. This study aimed to assess the inter-rater and test-retest reliability of the PTP-test and to explore its relationships with baseline variables.

Methods
A monocentric reliability study included 15 participants (10 female, 5 male) with acute NSLBP. Two physiotherapists independently performed PTP-test measurements to evaluate inter-rater reliability. Test-retest reliability was assessed after one week. Intraclass correlation coefficients (ICC), standard error of measurement (SEM) and smallest detectable difference (SDD) were calculated. Pearson correlations examined relationships with age, pain intensity, daily functional impairment (measured by the Roland-Morris Disability Questionnaire) and waist circumference.

Results
Inter-rater reliability ranged from ICC 0.29 to 0.84, with the highest value at the lateral point (P2). Test-retest reliability was lower (ICC 0.01–0.57). Moderate negative correlations were observed for waist circumference ($r \approx -0.50$), whereas correlations with other variables were weak or absent. The 95 % confidence intervals were relatively wide across all calculations and none of the results reached statistical significance.

Conclusion
The PTP-test showed variable reliability in acute NSLBP, with higher values at lateral points. Given the small sample size, the findings should be considered exploratory and interpreted cautiously. Further research with larger sample sizes is needed.

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Erfahrungen von Physiotherapeut:innen mit Motivational Interviewing: Eine qualitative Studie

Hintergrund
Motivational Interviewing (MI) gilt als patient:innenzentrierter Kommunikations-ansatz zur Unterstützung biopsychosozialer (BPS) Prinzipien in der Physiotherapie. Bislang fehlen vertiefte Erkenntnisse darüber, wie Physiotherapeut:innen die Integration von MI im routinierten klinischen Alltag erleben und in ihr physiotherapeutisches Handeln einbinden. Ziel der Studie war es, zu untersuchen, wie Physiotherapeut:innen mit MI-Weiterbildung die Auswirkung von MI auf ihr physiotherapeutisches Handeln erleben.

Methode
Es wurde ein explorativ-qualitatives Studiendesign gewählt. Mittels gezielter Stichprobenauswahl (purposive sampling, Schneeball-Sampling) wurden Physiotherapeut:innen mit MI-Weiterbildung und Anwendungserfahrung rekrutiert und in leitfadengestützten Online-Interviews befragt. Die Interviews wurden transkribiert und anhand der strukturierenden qualitativen Inhaltsanalyse nach Kuckartz und Rädiker deduktiv-induktiv ausgewertet.

Ergebnisse
Acht Physiotherapeut:innen nahmen an der Studie teil. Es wurden vier Hauptkategorien identifiziert: 1) Erlebte Veränderung des Rollenverständnisses, 2) Erlebte Veränderung im physiotherapeutischen Handeln, 3) Wahrgenommene Kontextbedingungen der MI-Integration in die physiotherapeutische Praxis sowie 4) Wahrgenommene Wirkung von MI, welche unter anderem Veränderungen hin zu einer patient:innenzentrierteren Haltung sowie kontextabhängige Implementierungsprozesse beschreiben.

Schlussfolgerung
Die Ergebnisse zeigen, dass MI in der physiotherapeutischen Praxis weniger als Technik, sondern vielmehr als Ausdruck einer patient:innenzentrierten Grundhaltung verstanden wird. Die Integration von MI geht dabei mit Veränderungen physiotherapeutischen Rollenverständnis und therapeutischen Handeln einher und scheint die Umsetzung eines BPS-Ansatzes zu unterstützen. Eine nachhaltige Umsetzung hängt stark von strukturellen Bedingungen und der Fähigkeit ab, diese Grundhaltung im klinischen Alltag aufrechtzuerhalten. Daraus ergibt sich die Relevanz, Reflexionsprozesse, professionelle Rollenentwicklung und den Umgang mit psychosozialen Themen stärker in Aus- und Weiterbildungsangebote der Physiotherapie zu integrieren.

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Effects of a Five-Day Versus a Single-Session Virtual Reality Training on Lucid Dream Induction in Inexperienced Lucid Dreamers

Background/Objective
Virtual reality (VR) may support lucid dream (LD) induction through immersive and metacognitive processes. Little is known about whether repeated VR exposure increases LD occurrence more effectively than a single VR session. The present study compared five-day VR training (5× VRT) with single-session VRT (1× VRT) regarding LD occurrence in inexperienced lucid dreamers.

Methods
A total of 61 participants were allocated to two non-randomised groups: a 1× VRT group (n = 41) and a 5× VRT group (n = 20). Following the intervention, participants completed a monitored laboratory nap session including polysomnography (PSG). LD occurrence was assessed using three operationalisations: subjective self-report, external dream report ratings, and signal-verified LDs (SVLD) based on left-right-left-right eye-movement signals during rapid eye movement (REM) sleep.

Results
No statistically significant group differences were observed across the primary categorical LD outcome measures. Self-reported LD rates were descriptively higher in the 5× VRT group. The exploratory post hoc analysis of DLQ sum scores did not reach statistical significance, although scores were descriptively higher in the 5× VRT group ($U = 284$, $p = .053$, $r = .25$).

Discussion/Conclusion
Repeated VR exposure did not result in statistically significant differences in the occurrence of categorically defined LD compared with single-session VR exposure. The descriptive findings suggest that repeated VR exposure may be more closely related to subjective lucidity-related dream awareness than to externally verified LD occurrence. The findings highlight both the exploratory potential and the methodological complexity of VR-supported LD induction research.

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Preliminary Exploration of a Compact Expert System: Feasibility, Acceptability, Usability and Initial Impacts on Physical Activity

Background
Computer-tailored interventions, such as expert systems grounded in the Transtheoretical Model, can promote physical activity. However, established expert systems can burden users through lengthy assessments and multi-page feedback. Whether a substantially reduced version is feasible, acceptable and usable for inactive adults and whether such use is associated with initial impacts on physical activity remains unclear. This study addresses these questions with the novel Compact Expert System (CES), in which nine items generate brief stage-matched feedback.

Methods
A single-arm pre-post feasibility study was conducted online between August and December 2025. Adults not meeting WHO physical activity guidelines completed a pre-test, four weekly CES cycles and a post-test. Primary outcomes feasibility, acceptability and usability were assessed using feasibility process indicators, the Feasibility of Intervention Measure, the Acceptability of Intervention Measure and the System Usability Scale and analyzed descriptively. As an exploratory secondary outcome, pre-post change in self-reported moderate-to-vigorous physical activity (MVPA) and Metabolic Equivalent of Task (MET)-minutes/week was assessed using an adapted Godin-Shephard Leisure-Time Physical Activity Questionnaire and analyzed with the paired sign test.

Results
Of 124 consenting participants, 112 completed the pre-test (recruitment rate 90.3 %). Of 91 intervention starters, 40 completed the post-test (final protocol population), resulting in a dropout rate of 56.0 % (95 % CI 45.8–65.8). Feasibility was rated moderate (mean 13.36, SD 3.14), acceptability low-to-moderate (mean 11.93, SD 3.32) and 60.0 % classified usability as below-average (95 % CI 44.6–73.7). The CES was perceived as easy to use, but willingness for frequent use received the lowest rating. In the final protocol population, MVPA/week increased in 78.4 % (95 % CI 62.8–88.6) and MET-minutes/week in 75.0 % (95 % CI 59.8–85.8). 30.0 % newly met WHO physical activity guidelines at post-test.

Conclusion
The feasibility, acceptability and usability of the CES were partially achieved and require improvement. Despite this, self-reported physical activity increased in most participants but should be interpreted cautiously. Iterative, user-centered refinement of the CES, focused on content relevance and engaging design, is required before evaluating effectiveness in further research.

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Somatosensory profiles differ between patients with non-specific neck-arm pain with and without heightened nerve mechanosensitivity

Background
While clinical neurological examination and electrodiagnostic studies are usually normal in patients with non-specific neck-arm pain (NSNAP), a subgroup of patients presents with clinical signs of heightened nerve mechanosensitivity upon neurodynamic testing. This increased neural mechanosensitivity may reflect a gain of function, presumably mediated by small nociceptive fibres. However, this assumption has not yet been verified. The aim of this study was to establish the somatosensory profiles of patients with unilateral NSNAP with and without heightened nerve mechanosensitivity and to compare these profiles between groups and with healthy controls (HCs).

Methods
Twenty-eight patients with unilateral NSNAP participated in the study. All patients had normal electrodiagnostic tests. Standardised upper limb neurodynamic tests were used to divide patients into those with heightened nerve mechanosensitivity (ULNTPOS) and those with normal nerve mechanosensitivity (ULNTNEG). Quantitative sensory testing was performed including measurements of thermal and mechanical detection and pain thresholds, mechanical pain sensitivity and wind-up ratios. All parameters were evaluated over the patients' maximal pain area. Corresponding areas were measured in 31 healthy controls (HCs).

Results
All groups were comparable for age, gender, quality of sleep and anxiety. Patients had higher depression scores compared to HC, without differences between patient subgroups. Patient subgroups were also comparable for symptom severity, disability and symptom duration. Patients with NSNAP demonstrated a significant loss of function for thermal thresholds compared to HCs. Patients with ULNTPOS also demonstrated reduced mechanical and vibration detection sense compared to HCs. Patients with ULNTPOS had significantly lower pain thresholds (cold, heat, pressure) compared to HCs. Interestingly, patients with ULNTPOS showed increased heat sensitivity compared to those with ULNTNEG.

Conclusion
The only parameter that differentiated patients with ULNTPOS and ULNTNEG was increased heat sensitivity in patients with ULNTPOS. This finding supports our hypothesis that the observed heightened neural mechanosensitivity reflects a gain of function, mediated by small nociceptive fibres.

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Reference values for dynamic balance in healthy adults aged ≥ 40 years using the Y-Balance Test kit and tape versions: a cross-sectional study

Background
Falls are a major public health concern and are associated with impaired dynamic balance. The Y-Balance Test is widely used for balance assessment. However, reference values for adults aged ≥ 40 years are lacking, and comparability between standardised kit and tape-based setups remains unclear. This study aimed to establish age- and sex-specific reference values for dynamic balance in adults aged ≥ 40 years and to compare outcomes between the two approaches.

Methods
In this descriptive cross-sectional study, 110 healthy adults aged 41–84 years performed the Y-Balance Test using a standardised test kit and a tape-based setup. Dynamic balance was quantified as normalised maximal reach distances and composite scores, expressed as a percentage of leg length (%LL). Empirical reference values were stratified by age, sex, method, and leg. Model-based values were derived using linear mixed-effects models. Agreement between methods was assessed using Bland-Altman analysis.

Results
Dynamic balance performance declined with age and showed greater variability among participants aged ≥ 70 years. Sex-related differences were observed across age groups and methods. Mean differences between methods were small (bias: –1.7 to –2.1 %LL), but limits of agreement of approximately ±17 %LL indicated limited interchangeability for individual monitoring. A proportional bias was identified for the non-dominant leg only, although explained variance was low.

Conclusions
This study provides age- and sex-specific reference data for the Y-Balance Test in adults aged ≥ 40 years to support clinical interpretation in older adults. Although both setups showed acceptable agreement at group level, interchangeability at the individual level was limited.

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Influence of objective feedback on the variability of peak forces during mobilisation of the cervical spine by physiotherapy students

Background
While objective feedback is considered an important factor in motor skill learning, its application in teaching mobilisation techniques remains limited. Students typically practice mobilisations by applying force to a joint without receiving objective feedback. This pilot study aimed to investigate the influence of objective visual feedback on peak force variability during cervical spine mobilisation.

Methods
In this randomised controlled pilot study, 19 third-semester physiotherapy students were randomly allocated to an intervention or control group. Participants performed five 30-second posterior-anterior Grade 3 mobilisations on a manikin's cervical spine, with force measured using a pressure pad. The intervention group received objective visual feedback during practice, while the control group did not. The primary outcome was peak force variability, defined as the standard deviation (SD) of peak forces. A linear mixed-effects model was used for analysis, and post-questionnaire responses were analysed descriptively.

Results
Peak force variability decreased in both groups without a significant group × time interaction ($p = 0.953$). The SD declined from 7.96 to 7.69 in the intervention group and from 8.76 to 8.35 in the control group. A sensitivity analysis excluding one outlier showed a lower, though still non-significant, interaction effect ($p = 0.208$). All participants in the intervention group (100 %) reported that the objective feedback was helpful.

Discussion
Although no statistically significant difference was observed, the lower variability in both groups suggests a potentially meaningful effect on the force consistency. Further research is needed to determine whether the changes result from feedback or general motor learning.

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Does Mechanical Stimulation in Form of Muscle Pressure Influence Lumbar Proprioception in Individuals with Chronic Low Back Pain – An Exploratory Experimental Study

Background/Objective
Individuals with chronic non-specific low back pain (CLBP) often have impaired proprioceptive control of the lumbar spine, particularly in proprioceptive weighting (PW). While spinal manipulative therapy (SMT) can modulate PW, it remains unclear whether the paraspinal muscle pressure inherent in SMT, applied without a high-velocity thrust, has a comparable effect. This exploratory study, therefore, investigated the acute effect of paraspinal muscle pressure on PW in individuals with CLBP.

Methods
45 participants were included, with 25 in the intervention group and 20 in a historical control group. Sample size was determined pragmatically, informed by comparable studies examining lumbar proprioception. The intervention involved targeted pressure on the lumbar muscles. The primary outcome was the PW ratio derived from postural sway analysis. Pre- and post-intervention changes in both groups were assessed and compared.

Results
Applying muscle pressure did not change the PW, and no meaningful between-group differences were observed. PW was more strongly associated with surface condition ($\beta = 0.801$, $p < 0.001$) and body mass index ($\beta = 0.087$, $p = 0.013$) than with group allocation.

Discussion/Conclusion
In this exploratory study, paraspinal muscle pressure did not affect PW. However, the findings support the feasibility of the PW ratio as an outcome measure and, given the absence of an acute pressure effect, justify using paraspinal muscle pressure as an active control condition in future SMT trials.

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Interpretation patterns of patient characteristics and behavior: a qualitative study of physiotherapists' accounts of clinical decision-making in pain management

Objectives
The goal of this study was to explore physiotherapists' interpretation of patient characteristics and behaviors, and how these interpretations are articulated in their accounts of clinical decision-making. Particular attention was paid to patients' pain expression and pain behavior.

Methods
A qualitative exploratory study was conducted, involving semi-structured interviews with ten physiotherapists working in German-speaking Switzerland. Data analysis was informed by qualitative content analysis, focusing on the patient characteristics and behaviors mentioned, the therapeutic context in which they were described and the presentation and justification of therapists' decisions within these contexts.

Results
Physiotherapists' accounts of clinical decision-making in pain management revealed variable, context-dependent interpretation patterns. These patterns were constructed through the evaluation of behavioral cues and patient profiles, which were mobilized situationally to assess patients' credibility, engagement, and therapeutic complexity. Characteristics and behaviors were associated to the attribution of responsibility in therapy, and their interpretation informed therapeutic strategies such as adaptation, negotiation and disengagement.

Discussion
These findings highlight the heterogeneous and situational nature of interpretative processes within physiotherapeutic clinical decision-making. This study contributes to a more detailed understanding of how clinical decision-making is constructed in physiotherapeutic pain management. It emphasizes the importance of reflective approach to biopsychosocial and culturally informed care.

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Weshalb werden Patient:innen in der Schweiz physiotherapeutisch behandelt? Eine Querschnittsstudie mittels REDCap Fragebogen.

Hintergrund
Die Physiotherapie zählt zu den am schnellsten wachsenden Kostensegmenten der obligatorischen Krankenpflegeversicherung in der Schweiz. Eine mögliche Erklärung ist eine Ausweitung des Indikationsspektrums, insbesondere in nicht-muskuloskelettale (Nicht-MSK) Bereiche; systematische Daten zu den behandelten Indikationen in der Schweizer Physiotherapie fehlen jedoch. Ziel dieser Studie war eine erstmalige systematische Kategorisierung der in der Schweiz behandelten Indikationen sowie die Untersuchung von Unterschieden nach Alter und Geschlecht.

Methode
Querschnittsstudie mittels anonymer Online-Umfrage (REDCap) bei in der Schweiz praktizierenden Physiotherapeut:innen, durchgeführt zwischen Dezember 2025 und Februar 2026, mit Rekrutierung über kantonale Berufsverbände. Pro Therapeutin wurden retrospektiv bis zu zehn Patientenfälle erfasst (Freitextindikation, Setting, Tarifposition, Körperregion, Beschwerdedauer, Therapiemodalität). Die Freitextindikation wurden mittels eines Python-Skripts in 18 sich gegenseitig ausschliessende Kategorien klassifiziert. Als Primäranalyse erfolgte eine cluster-korrigierte Inferenz mittels Generalized Estimating Equations (geepack::geeglm, Austauschkorrelation, Therapeut:in als Cluster-ID).

Resultate
407 Physiotherapeut:innen aus 24 Kantonen reichten 2465 Patientenfälle ein. Muskuloskelettale Indikationen machten 64,3 %, nicht-muskuloskelettale Indikationen 35,7 % aus. Die häufigsten Kategorien waren Wirbelsäule/Rückenschmerz (20,6 %), postoperative Zustände (13,4 %) und neurologische Indikationen (12,5 %); Der Nicht-MSK-Anteil zeigte einen U-förmigen Altersverlauf (Joint-Wald-Test $p < .001$).

Schlussfolgerung
Die Schweizer Physiotherapie versorgt ein breites Indikationsspektrum. Muskuloskelettale Indikationen machen die Mehrheit der behandelten Patient:innen aus, jedoch gibt es einen substanziellen Anteil nicht-muskuloskelettaler Indikationen. Die Daten liefern eine erste empirische Grundlage für Versorgungsplanung, Ausbildung und Tarifstruktur und unterstützen die Etablierung eines longitudinalen nationalen Indikationsregisters.

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Informal Caregivers in Focus: Usability and Feasibility Study of a Massive Open Online Course for Stroke Caregivers in Switzerland

Background
Informal caregivers of people living with stroke often face considerable challenges due to a lack of accessible and structured support. Digital interventions such as Massive Open Online Courses (MOOCs) may help address this gap. This study aimed to explore informal caregivers' experiences with a MOOC for stroke caregivers in Switzerland, focusing on its usability and feasibility.

Methods
We conducted an exploratory cross-sectional study using a qualitatively driven embedded mixed methods design. We collected qualitative data through semistructured interviews and analyzed them using thematic analysis (TA). Quantitative data were collected with the User Experience Questionnaire (UEQ) and analyzed descriptively. Qualitative and quantitative findings were integrated by comparing qualitative themes with corresponding UEQ results.

Results
Nine informal caregivers participated. Regarding usability, participants reported positive experiences, describing the MOOC as easy to use with intuitive navigation, clear structure, and reliable technical functionality. These findings were supported by positive UEQ ratings in usability-related dimensions (perspicuity, efficiency, dependability). Feasibility varied depending on individual circumstances, particularly time availability and timing within the caregiving situation. Participants perceived the MOOC as relevant and supportive, applied its content in caregiving practice, but also identified unmet needs, including limited opportunities for interaction and a desire for more individualized content.

Conclusions
The MOOC represents a usable and relevant digital intervention for informal caregivers of people living with stroke. However, its success depends not only on usability but also on alignment with caregivers' individual circumstances. Future developments should incorporate individualized content and interactive elements to better address diverse caregivers' needs.

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