

# Individuals' beliefs about the biopsychosocial factors that contribute to their chronic musculoskeletal pain

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# BMJ Open Individuals' beliefs about the biopsychosocial factors that contribute to their chronic musculoskeletal pain: protocol for a qualitative study in the UK

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## ABSTRACT

**Introduction** Chronic musculoskeletal pain (CMP) is described as pain that persists for longer than 3 months. At present, no research is available that understands why CMP develops and continues from the perspective of the individual. Research is needed to establish if there are any consistent biopsychosocial factors perceived as contributing to CMP and what informs such beliefs. Understanding individual beliefs will inform more effective communication between clinicians and patients about their CMP, as well as informing future research into the epidemiology of CMP. Interpretative phenomenological analysis will be used as a methodological framework as it explores how individuals make sense of their world through personal experiences and perceptions while preserving individual nuance. The aim of this study is to understand individuals' beliefs and perceptions about the biological, psychological and social factors, which contribute to the development and maintenance of their CMP.

**Methods and analysis** A qualitative study informed by the Consolidated Criteria for Reporting Qualitative Research using interpretative phenomenological analysis and semistructured interviews. A maximum variation purposive sample of 6–12 adults with CMP will be recruited from the general public in the UK. One semistructured interview will be conducted with each participant via an online video platform with interviews transcribed verbatim. The interview schedule (codesigned with expert patients and informed by existing evidence) identifies three domains of important questions; (1) patient beliefs on why they developed and continue to experience CMP; (2) the relationship between their biopsychosocial experiences and CMP; and (3) the origin of their beliefs. Strategies such as 'member checking' will be employed to ensure trustworthiness.

**Ethics and dissemination** Ethical approval was granted by the Research Ethics Office at the University of Birmingham (reference ERN\_21-0813). Informed consent will be obtained from all participants. The study findings will be submitted for publication in a peer-reviewed journal and for presentation at conferences.

## INTRODUCTION

Chronic musculoskeletal pain (CMP) is described as primary or secondary pain

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The methods employed for this qualitative study are rigorous, designed using the Consolidated Criteria for Reporting Qualitative Research.
- ⇒ The inclusion of people with all types of chronic musculoskeletal conditions will establish findings pertinent to a great number of stakeholders.
- ⇒ The flexibility of semistructured interviews will ensure topics important to both the researcher and the participant are discussed while interpretative phenomenological analysis will enable the development of rich data entrenched in the lived experiences of the individual.
- ⇒ The use of virtual interviews for research is relatively new and unexplored, and therefore, it is unclear if this is equally as effective as in-person interviews; it is possible that issues such as internet access and technology literacy may negatively impact the virtual interview process.
- ⇒ Although in line with interpretative phenomenological analysis methods, the small sample size may limit the applicability of the study findings.

arising from bones, joints, muscles or related soft tissues lasting longer than 3 months.<sup>1</sup> The National Health Service spent approximately £4.7 billion on treating musculoskeletal conditions in 2015,<sup>2</sup> a figure which is likely higher now. Despite this, most recent evidence identifies a 43% current prevalence of CMP across adults in the UK,<sup>3</sup> which is steadily rising,<sup>4</sup> and that 79%–92% of those with CMP continue to experience pain up to 12 years later.<sup>5–7</sup> This suggests that further research into CMP is required.

Pain is experienced due to a complex interaction between the biological and psychological systems of the body which are influenced by social factors.<sup>8–10</sup> This interaction can lead to a continued or repeated experience of musculoskeletal pain—CMP—despite no evidence of actual or potential damage to

musculoskeletal structures.<sup>8 9 11 12</sup> These altered or sensitised mechanisms of musculoskeletal pain have been defined as ‘nociplastic pain’,<sup>13</sup> and current research shows that beliefs about pain may influence the experience and development of CMP.<sup>14–16</sup>

A recent Cochrane review of both qualitative and quantitative research concluded that patient beliefs about their musculoskeletal pain shapes their attitudes and behaviours on how to manage it.<sup>17</sup> In addition, studies demonstrate that a patient’s beliefs in the efficacy of an intervention highly correlates with positive outcomes; a finding which is consistent across multiple interventions for CMP.<sup>18–22</sup> Biomedical approaches currently dominate management of musculoskeletal disorders (eg, imaging, blood tests, physical assessments, pharmaceutical management, manual therapy and surgeries),<sup>23</sup> which may influence individuals’ beliefs toward biological factors being the main cause of CMP. This in turn may reduce the likelihood of successful biopsychosocial management if individuals subsequently do not hold these same beliefs for psychosocial factors. However, this is not currently well understood. Furthering comprehension of individuals’ beliefs on the causes of CMP and where these beliefs originate will provide the opportunity to address unhelpful beliefs and ensure that management approaches are well aligned, thus improving the likelihood of successful management. This will benefit patients, clinicians and researchers.

Furthermore, early risk stratification for disease and proactive management is a strategy that works well for management of other chronic diseases such as heart disease<sup>24</sup> and diabetes,<sup>25</sup> and therefore, may be a useful strategy for improving management of CMP. However, awareness and understanding of the epidemiology of the disease is required for this to be effective. Many biopsychosocial risk factors for development of CMP are identified in existing research with many epidemiological cohort studies synthesised through several systematic reviews<sup>26–28</sup> and an in-progress umbrella review.<sup>29</sup> Qualitative research exploring patient beliefs around why they develop and continue to experience CMP may identify risk factors for its development, which are not amenable to detection through quantitative methods.<sup>30 31</sup> Earlier identification of individuals at risk of CMP will provide the opportunity for proactive management as practised for other chronic diseases.

To better manage CMP, a thorough understanding of the biopsychosocial factors that may contribute to its development and prolonged presence is needed. Existing research has explored this through both quantitative<sup>26–28</sup> and qualitative methods.<sup>32–34</sup> However, this research tends to be specific to a particular musculoskeletal condition such as lower back pain. To the best of the authors’ knowledge, there is no qualitative research that includes participants with all forms of CMP investigating why they believe they developed and continue to experience CMP. Those with lower back pain may demonstrate beliefs such as damage to and poor healing of the spine<sup>34</sup> and

these beliefs may contribute to development of chronic lower back pain.<sup>26</sup> Similar beliefs may exist in those with any form of CMP and therefore qualitative research is required to explore this further.

These are complex factors which are influenced by a variety of individual aspects such as race, ethnicity and culture,<sup>35</sup> and therefore, this needs to be explored from individual perspectives. Qualitative methods are useful in healthcare research, particularly in the discovery of emerging themes or phenomena which are not amenable to quantitative methods,<sup>36</sup> and therefore, are well placed to investigate this further. Interpretative phenomenological analysis methods may be particularly useful as this will observe in detail how participants make sense of their world by exploring personal experiences and perceptions, thus enabling the preservation of individual nuance and meaning inherent to the participants experience of CMP<sup>37</sup> which is often lost in larger data sets.<sup>38</sup>

### Aims and objectives

The aim of the study is to understand patients’ beliefs and perceptions on the biological, psychological and social factors which contribute to the development and continued experience of CMP. The objectives are:

1. To explore individuals’ beliefs on the factors that contributed to development and maintenance of their CMP.
2. To explore the biological, psychological and social experiences of individuals and whether they believe there to be any contributory relationship to the development and continued experience of their CMP.
3. To explore where individuals’ beliefs originate.

## METHODS AND ANALYSIS

### Design and theoretical framework

This qualitative study has been designed using the Consolidated Criteria for Reporting Qualitative Research.<sup>39</sup> Research methods are underpinned by interpretive phenomenological analysis (IPA) and data will be collected using semistructured interviews.

IPA is situated as a minimal hermeneutic realist, where there is a belief that an external reality exists but is presented by an individual’s view of it.<sup>40</sup> Furthermore, it is considered an ideographic approach that can illustrate how individuals make sense of a specific situation and presented in a way that provides details of this. Research that uses IPA seeks to present the uniqueness of the individuals view of the world but at the same time present further understanding through the researchers’ own interpretation. This is referred to as the double hermeneutic.<sup>41</sup>

### Study setting

This study is hosted by the University of Birmingham. Members of the general public of the UK will be targeted for participation with interviews taking place over video (Zoom) with both the participant and researcher in a quiet and private location.

## Sample

A purposive sampling maximum variation approach will be employed to ensure input from patients with a rich variety of backgrounds and experiences.<sup>42</sup> A distinctive feature of IPA is its commitment to a detailed interpretative account of cases which can therefore only realistically be done on a smaller sample size, aiming for depth rather than breadth.<sup>37</sup> Collins and Nicolson<sup>38</sup> suggest that analysis of large data sets may result in the loss of ‘potentially subtle inflections of meaning’ (pp 626). Based on this, and in order to ascertain rich detail of the lived experience of participants, the planned sample size range is 6–12 to meet the needs of this IPA study.

## Participants

### Inclusion criteria

Any adult (>18 years) with musculoskeletal pain which has been present for at least 3 months.

### Exclusion criteria

Individuals will be excluded if they: are unable to communicate verbally and fluently in English, have a high risk or evidence of poor tissue healing (eg, autoimmune disorders), have injuries where tissue healing may not be complete at 3 months (eg, fractures), have pain which is non-musculoskeletal related chronic pain (eg, cancer) or if they have CMP in the presence of potential systemic or inflammatory conditions (eg, spondyloarthritis, rheumatoid arthritis).

### Recruitment

Potentially eligible participants will be made aware of the study through advertisement. The lead researcher (MD) will make direct email contact with groups of people representative of the inclusion criteria, first through a patient and public involvement (PPI) group of individuals with CMP based at the University of Birmingham, and if necessary thereafter through private physiotherapy practices and chronic pain charities (eg, PainUK). Details of the study may also be circulated on social media with the aim of achieving the desired sample variance.

Potentially eligible and interested participants will contact the lead researcher via email. The lead researcher will provide potentially eligible participants with the participant information sheet (online supplemental file A) and confirm eligibility with the eligibility screening questionnaire (online supplemental file B). Informed consent will then be obtained by the lead researcher (MD), who is a senior musculoskeletal physiotherapist, Good Clinical Practice (GCP) trained and experienced with research.

No prior relationship exists between the potentially eligible participants and the lead researcher (MD). Potentially eligible participants will be aware that the lead researcher (MD) is a senior musculoskeletal physiotherapist in the National Health Service and is trained and experienced with research, but will not be aware of any

other characteristics such as biases, assumptions about or reason for interest in CMP.

## Semistructured interviews

One semistructured interview will be conducted by the lead researcher (MD) with each participant within 8 weeks of obtaining informed consent. Semistructured interviews enable the researcher to investigate a specific topic while also allowing the participant to respond in their own terms and discuss topics pertinent to them.<sup>43</sup> Particularly, semistructured interviews are useful in exploring meanings and realities of participant experiences and how these might be influenced by discourses, assumptions or ideas which exist in society.<sup>44</sup>

Due to the COVID-19 pandemic, all interviews will be conducted remotely using a secure online video platform (Zoom) to reduce risk to participants and ensure unhindered data collection. An interview schedule has been developed in order to direct and maintain consistency and structure across interviews (online supplemental file C). The interview schedule has been informed by the biopsychosocial model of health, an extensive umbrella review of the factors associated with development of CMP (in preparation for publication), the expertise of the authors (MD, ABR, AS and NRH) and input from patients and public through a meeting with a PPI group with CMP. Details of PPI input have been outlined in accordance with the Guidance for reporting Involvement of Patients and the Public (GRIPP) 2 checklist,<sup>45</sup> which is presented in [table 1](#). The interview schedule will be piloted to determine effectiveness of language and comprehension as well as timing, and amended as necessary prior to data collection. The semistructured nature allows for the emergence of new themes to develop which are important to the participant and facilitates the maintenance of flowing conversation.<sup>43</sup> An iterative approach to the interviews will be taken with questions within the interview schedule being adapted or refined based on preceding interviews.

All interviews are voluntary with participants free to pause the interview at any stage or cease the interview altogether should they choose. Should a participant become distressed at any point during an interview, in accordance with our risk assessment for the study (online supplemental file D), participants will be offered the opportunity to stop and will be signposted to any appropriate services as necessary by the lead researcher. Interviews will be audiorecorded and transcribed verbatim by the lead researcher. All transcripts will be anonymised through the use of participant identification numbers at all times in line with GCP and General Data Protection Regulation (GDPR) guidance. ‘Member checking’ will be employed with interview transcripts returned to participants to review, clarify meaning or add further reflections as they wish to improve trustworthiness of data.<sup>46</sup>



**Table 1** PPI input detailed in accordance with the GRIPP 2 checklist<sup>45</sup>

Aims	<ul style="list-style-type: none"> <li>▶ assess the feasibility of the project by understanding if people with CMP would participate.</li> <li>▶ establish if this research was valuable to those with CMP.</li> <li>▶ establish what language/terminology should be used.</li> <li>▶ understand how to enhance engagement from potential participants/participants.</li> <li>▶ trial questions from interview schedule</li> </ul>
Methods	MD provided an overview of research plan through a PowerPoint presentation to a group of people who have CMP and other healthcare researchers (N=approximately 20). MD and NRH facilitated interactive discussion among the group through questions which reflected the aims throughout the presentation.
Results	<ol style="list-style-type: none"> <li>1. The proposed research study was found to be valuable with members expressing a willingness to participate in discussion, volunteering their own beliefs about their CMP. This suggested good feasibility of the study.</li> <li>2. The group provided valuable insights into the most appropriate terminology and descriptions of CMP to improve participation. Namely, it was advised not to use the term 'persistent musculoskeletal pain' as this was confusing with members unsure if this described their pain. The term 'CMP' was suggested instead.</li> <li>3. The group advised researchers to be careful not to inadvertently suggest that CMP is psychological and not biological as this may be contentious, affecting participation and engagement in the interview.</li> <li>4. The group identified that they would like to discuss their thoughts and beliefs around their CMP with a researcher in a semi-structured interview format.</li> <li>5. The group demonstrated a willingness to openly discuss psychological and social factors they feel influenced their own CMP in response to questions from the interview schedule.</li> </ol>
Discussion and conclusions	<p>The PPI group had direct influences on the following aspects of the study:</p> <ol style="list-style-type: none"> <li>1. The study was found to be feasible and valuable encouraging progression of the study.</li> <li>2. The term 'persistent musculoskeletal pain' was changed to 'CMP' in the study title, all study documents, interview questions and future publications.</li> <li>3. The participant information sheet and interview questions were amended to reduce the likelihood of making inadvertent suggestions of the nature of CMP being more psychological than biological.</li> <li>4. The use of semistructured interviews was confirmed as part of the methods for the study.</li> <li>5. Interview questions were validated and therefore confirmed as part of the interview schedule.</li> </ol>

CMP, chronic musculoskeletal pain; GRIPP, Guidance for Reporting Involvement of Patients and the Public; PPI, patient and public involvement.

### Data analysis

The aim for the IPA analysis is that the researcher will observe in detail how participants make sense of their world by exploring personal experiences and perceptions. The lead researcher (MD) and coauthors (ABR, AS and NRH) will interpret and make coherent sense of this by linking with their own personal and professional experience and the findings of extant literature.<sup>37</sup> This is dependent on both the participants ability to articulate thoughts and experiences and the researchers' ability to reflect and analyse<sup>41</sup>; allowing for both aspects leads to richer analysis.

For the purposes of this research, IPA will use four steps based on Smith and Osborn<sup>37</sup> (figure 1).

### Strategies to ensure trustworthiness

A review of IPA studies and methods outline several suggestions for the methods of high-quality IPA research.<sup>41</sup> First, the researcher will provide a reflexive account of their role in the dynamic process that occurs during the interviews. Second, the researcher will be open to using a priori theory as a framework within which to situate the analysis. Third, consideration will be made of the hermeneutic circle. Lastly, validation checks of interpretation for the lead researcher (MD) will be made by the coinvestigators (NRH, AS and ABR).<sup>47</sup> Various further

strategies will be employed including member checking and acknowledging researchers' potential preconceptions to avoid bias.<sup>46</sup>

### Study status

Participant recruitment and all subsequent study methods as outlined above have not yet commenced at the time of submission of this protocol for peer review. Participant recruitment will begin shortly after acceptance of this protocol to a peer-reviewed journal. The planned timeline from study commencement to completion is 3 months.

### Patient and public involvement

PPI has been integral to the development of this research. The lead researcher has conducted an interactive discussion with members of the public with CMP from the Centre for Precision Rehabilitation for Spinal Pain PPI Group at the University of Birmingham. This is presented in table 1 in accordance with the GRIPP 2 checklist.<sup>45</sup>

## ETHICS AND DISSEMINATION

### Ethical approval

This study was reviewed and approved by the Research Ethics Office at the University of Birmingham, United Kingdom (reference ERN\_21-0813).

Step one: looking for themes in the first case	
<b>Actions</b> <ul style="list-style-type: none"> <li>• Read transcript several times.</li> <li>• Make annotations about what is interesting or significant about what was said.</li> <li>• Transform annotations into emerging theme titles.</li> </ul>	<b>Aims</b> <ul style="list-style-type: none"> <li>• Make sense of individuals' personal and social world.</li> <li>• Achieve slightly higher level of abstraction of original annotations with emerging themes.</li> <li>• Thread back to what was originally said.</li> </ul>
Step two: connecting the themes	
<b>Actions</b> <ul style="list-style-type: none"> <li>• List themes and seek connections between them.</li> <li>• Initially themes placed in chronological order then in a more analytical or theoretical order.</li> <li>• Clusters of themes are connected and named as superordinate themes.</li> <li>• Superordinate themes and themes tabulated with a phrase given as an identifier.</li> <li>• Identifier links back to transcript where theme evidenced.</li> <li>• Themes which do not fit in emerging structure and not evidence rich will be dropped.</li> </ul>	<b>Aims</b> <ul style="list-style-type: none"> <li>• To make coherent analytical sense of many individual themes.</li> <li>• Researcher utilises own resources to make sense of interview.</li> <li>• To most strongly represent participants thoughts with superordinate themes.</li> <li>• Ensure superordinate themes link back to what was said.</li> </ul>
Step three: continuing the analysis with other cases	
<b>Actions</b> <ul style="list-style-type: none"> <li>• Continue as per step one and two with all transcripts.</li> <li>• Re-review earlier transcripts to assess for superordinate themes which emerge later in analysis.</li> <li>• Construct a final table of superordinate themes based on prevalence in data, richness of evidence, how well they link to other themes and how well articulated in data.</li> </ul>	<b>Aims</b> <ul style="list-style-type: none"> <li>• Continue to identify unique perspectives but also identify new emerging themes.</li> <li>• Identify where data is similar and where it diverges.</li> <li>• Iteratively reanalyse data.</li> <li>• Finalise superordinate themes.</li> </ul>
Step four: writing up	
<b>Actions</b> <ul style="list-style-type: none"> <li>• Write narrative argument based on final superordinate themes to answer research aims and objectives.</li> <li>• Use verbatim extracts to evidence arguments made.</li> <li>• Expand upon analysis already made by explaining, illustrating, and nuancing themes.</li> </ul>	<b>Aims</b> <ul style="list-style-type: none"> <li>• Move from final superordinate themes to final statement outlining meaning inherent to experience of participants.</li> <li>• Distinguish clearly between what participant said and researcher's interpretation of it.</li> </ul>

**Figure 1** IPA methods based on Smith and Osborne.<sup>37</sup> IPA, interpretive phenomenological analysis.

### Informed consent

In order to reduce risks due to COVID-19, informed consent will be obtained remotely. Participants will have the option to complete an informed consent form electronically and return via email, or to complete a form by hand and return via mail. In both instances, the lead researcher will call the participant to explain and ensure they understand the informed consent form before signing and will remain on the phone with the participant while the informed consent form is completed and

signed. The lead researcher will then countersign the completed informed consent form and return a copy to the participant via email or mail.

### Data management

All investigators will comply with GCP standards and all data will be handled in accordance with the Data Protection Act 2018 and GDPR standards.

Audio recordings of interviews will be conducted with a password protected digital recording device. Once



transcribed verbatim by the lead researcher, the audiorecording will be deleted. All study paperwork containing participant data, including interview transcriptions, will be stored securely on a password-protected computer for the purpose of data analysis. Only the named researchers will have access to the data. Once data analysis is completed, the data will be stored securely by the University of Birmingham Research Data Store for 10 years and then destroyed. Participants will be anonymised with no identifiable information in the data analysis or any subsequent dissemination of findings.

### Assessment and management of risks

There are minimal risks identified for this study with mitigation strategies in place. One risk is that during interviews participants may become emotionally distressed when discussing their thoughts about their condition. The lead researcher is experienced with this situation through their role as a senior musculoskeletal physiotherapist and in this case will offer the participant the opportunity to take a break and remind that participation is voluntary and that they can choose not to answer any questions or to stop the interview should they wish. Participants will also be offered if they would like a family member present during the interview to ensure their well-being. The lead researcher may also signpost participants to relevant support services if needed (eg, NHS services, Mind, Togetherall, Samaritans). Further information on assessment and management of risks is available through our full risk assessment for this study (online supplemental file D).

### Dissemination of findings

The study findings will be submitted for publication in a peer-reviewed journal and the study abstract will be submitted to national and international conferences. A lay summary of finding will be disseminated to participants of this study and to the University of Birmingham's established PPI group.

## DISCUSSION

The present evidence base looking at factors associated with CMP is largely composed of quantitative research. While useful, qualitative research will provide greater depth and insights into personal experiences, thus providing richer data which may identify additional emerging causative factors for CMP as well as bolstering existing findings.<sup>36 48</sup> Methods triangulation in this manner is a widely employed approach in epidemiology research whereby 'if results of different approaches all point to the same conclusion, this strengthens the confidence of the finding'.<sup>49</sup> IPA is particularly useful in this regard because of the double hermeneutic which will capture the unique view of the individual on why they have CMP but will also elicit further understanding of this through the researchers' own interpretations.<sup>41</sup> This enables influence of interpretation based on the existing

evidence base as well as the professional experiences of the researchers as musculoskeletal physiotherapists (MD, NRH and ABR).

To this end, the planned study may inform future research into risk stratification for CMP and proactive management as practised for other long-term conditions. Epidemiological research has led to risk stratification for long-term conditions with proactive management to prevent its development, which has shown to be effective.<sup>24 25 50</sup> Findings from a recent systematic review suggest that this may also be a promising line of research in the management of CMP.<sup>51</sup> However, further research is required due to limited applicability of these findings due to most existing research being specific to low back pain only and poor to moderate quality of studies.<sup>51</sup> The proposed study may inform future research with qualitative evidence of factors which may contribute to CMP. Additionally, unhelpful beliefs may be identified which may hinder proactive management such as education and behavioural advice.

Past studies have shown that beliefs shape attitudes and adherence towards healthcare management in individuals with CMP.<sup>52 53</sup> Furthermore, beliefs may affect communication with healthcare professionals<sup>54</sup> and effectiveness of intervention.<sup>18-22</sup> It is therefore important to understand if unhelpful beliefs exist and the nature of such beliefs in people with CMP. Clinicians may play a vital role in this with research showing that clinicians' attitudes and beliefs inform that of their patients.<sup>55 56</sup> Further to this, when clinicians' beliefs are biomedical in nature, this is associated with increased time off work, reduced physical activity and poorer adherence to treatment guidelines for their patients.<sup>55</sup> While this highlights the critical role of clinicians in shaping beliefs, a recent Cochrane review echoed the findings that patient beliefs about their musculoskeletal disorders shape their attitudes and behaviours on how to manage it.<sup>17</sup> The planned study will provide valuable insights into what individuals with CMP believe about their conditions and where this originates.

The planned study will use a small sample and will, therefore, provide the foundations to inform further investigation. This is in line with Medical Research Council and National Institute for Healthcare Research guidance for developing complex interventions to improve healthcare.<sup>57</sup> Particularly, this embodies the 'Undertake primary data collection' action which encourages use of qualitative research to understand the context within which interventions will operate. This will, therefore, provide foundation research, which will provide clinicians and researchers an opportunity to address unhelpful beliefs and design personalised management approaches.

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**Contributors** MD is the lead researcher leading in the protocol development, ethical approval, data collection, data analysis and dissemination. NRH, AS and ABR have provided feedback and support in the development of the protocol, all study documents including the design of interview schedule, and the application for ethical review. MD, NRH, AS and ABR have led on the conception and design of the study, will be involved in data interpretation, analysis, conclusions and dissemination. MD drafted the initial manuscript. All authors read, contributed to and agreed the final manuscript. MD is the guarantor.

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