The establishment, maintenance, and adaptation of high- and low-impact chronic pain: a framework for biopsychosocial pain research


1. Introduction

We present a framework for the study of states of chronic pain and transitions between those states. We capture in the framework the dynamic nature of pain: people live with pain that changes over time. First, we offer definitions of both acute and chronic pain and explore the contextual considerations related to the common use of this temporal dichotomy. Second, we promote the importance of incorporating the impact pain has on a person’s life. Finally, we discuss the challenges and opportunities inherent in implementing this common approach. Our goal is to produce a framework for the study of the development, maintenance, and resolution of chronic pain.

1.1 Definitions of acute and chronic pain

The terms “acute” and “chronic” represent a temporal dichotomy, with “acute” meaning short lived or immediate, and chronic meaning long term. Colloquially, however, both can be used interchangeably to mean “bad,” causing confusion in clinical encounters when patients use these as terms for severity or impact. Whether a single brief event or a constant feature of life, pain interrupts to prioritise protection, interferes with activity, reduces quality of life, and can alter identity. Protection is achieved by escape from harm, avoidance of perceived danger, withdrawal for respite and repair, and communication of incapacity and environmental risk; longer-term protection is achieved by learning the cues for pain and injury. From this perspective, pain is most usefully considered a need state, fundamentally a motivational drive to protect.

2. A person’s pain status

Pain is defined as “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.” There is a logical case of a state of “no pain,” but to have no pain is a rare occurrence, only recently made possible by the advent of anaesthesia/analgesia. A state of the continuous absence of any pain at all is profoundly abnormal, appearing only as congenital nociceptor deficiency or dysfunction. It is far from adaptive, notably leading to major clinical problems associated with the absence of defensive responding and learning with a consequent severe shortening of life expectancy.

2.1 Acute and chronic

The terms “acute” and “chronic” represent a temporal dichotomy, with “acute” meaning short lived or immediate, and chronic meaning long term. Colloquially, however, both can be used interchangeably to mean “bad,” causing confusion in clinical encounters when patients use these as terms for severity or impact and clinicians use them for temporality.

In this article, we use “acute pain” to mean pain of short duration, without any implication of severity or urgency. The pragmatic challenge in its use is the length of this short duration. Acute pain is typically defined as lasting from onset to 3 months in duration and so encompasses everything from a momentary muscular “cramp” to postoperative pain. Therefore, acute pain is both common and a normal part of everyday life. The few studies that establish the base rate of everyday pain generally report high incidence. For example, in 1 observational study of everyday pain in 3- to 7-year-olds, the event rate was 0.33 incidents per hour per child. Painful bumps and
different decisions about the number, frequency, and extent of
classifies a number of chronic headaches as episodic with
pain that changes in quality or location and which fluctuates and/
and child is now thought more clinically relevant. Given the
includes the experience of people who have intermittent,
this serves as the
dichotomy (acute–chronic). We argue for the informed use of
longevity, does not negate the value of a simple duration
defined in the United States as activity limitation47 and later as
activity and participation limitation,33,39 contrasted with a
category of chronic pain without limitations. This thinking was
more recently captured in the Graded Chronic Pain Scale Revised
as high impact compared with mild or bothersome pain.45 These
categories allow for greater discrimination when trying to bridge
between population-based studies of prevalence of chronic pain
and clinical studies with adults expressing healthcare needs. The
prevalence of adults with high-impact chronic pain is more
typically estimated conservatively as at least 5%, in contrast to the
headline population figures for all chronic pain, conservatively
estimated at 20%.33,55
The idea that chronic pain can have low or no impact is an
interesting one. Indeed, the potential for the existence of pain
without impact is at the heart of the biopsychosocial model6,16,17
and a treatment goal in psychological rehabilitation.54 Although
the complete resolution of chronic pain is desirable as a treatment
objective, the transition to a state of low(er) impact chronic pain is
often more realistic and still an important objective for individuals,
healthcare providers, and society. An example is in the context of
normal ageing with accommodation to life with increasingly
unreachable goals achieved by altering those goals.12
For our purposes, high impact is defined by the extent of
difficulties in function and disability (self-care, occupational
engagement, and social activities)26 in line with the WHO. Again,
we propose an informed and context-dependent use, with the
need to look beyond simple labels when combining data or insights. It is a useful starting point to explore the specific features of how high impact can be determined from the available measurement.

3. States and transition
Taking duration and impact together, we propose a transitional
framework for the study of 5 categorical “states” (Table 1 and
Fig. 1), which include acute low-impact pain, acute high-impact
pain, chronic low-impact pain, chronic high-impact pain, and a
“resolved” no chronic pain state.
Although we refer here to pain duration (acute, chronic) and
impact (high, low) as dichotomies, we recognise the continuous,
overlapping and dynamic aspect of the pain experience. For
many people, pain is an additional burden to other diseases. Our
choices here are illustrative not ontological providing a framework
for investigation—placing an emphasis on measurement and its
use within individual investigations. In line with the US pain
strategy,26 we recognise that introducing categories creates
opportunities for research, in particular population-based research, but can under some circumstances lead to a statistical loss of information.

Table 2 outlines 10 possible trajectories of change in states, representing transitions (or absence of transition) in a person’s pain state. We are interested in the onset of chronic pain, whether it is low or high impact, and its starting point of low- or high-impact acute pain. We are also interested in no change, or the maintenance of chronic pain, whether low or high impact, and the factors that lead to people becoming “stuck” in their pain state. And finally, we are interested in change in state, worsening from low impact to high impact, or improving from high impact to low impact, or a resolution from chronic low- or high-impact pain back: transition to a new normal state in which the specific pain(s) meeting the criteria for chronicity has/have resolved, but the natural rate of everyday pain resumes. These states and transitions are outlined in Figure 1.

4. Further considerations

Our focus on duration and impact raises several issues for consideration:

(1) Pain can be described by its pathological cause, mechanism, intensity, location, frequency, diurnality, or as a collection of features in a measure of severity. Such features are important, but, in this framework, they would be held in analyses as potential predictors, correlates, or process variables in an examination of impact and duration rather than part of their definition.

(2) The premise that a person can have chronic pain with low impact clashes with the ICD-11 definition of primary chronic pain.
Table 2: Possible transitions between chronic pain states.

<table>
<thead>
<tr>
<th>Chronic pain status</th>
<th>1st observation</th>
<th>2nd observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Acute low impact</td>
<td>Chronic low impact</td>
</tr>
<tr>
<td>Onset</td>
<td>Acute low impact</td>
<td>Chronic high impact</td>
</tr>
<tr>
<td>Onset</td>
<td>Acute high impact</td>
<td>Chronic low impact</td>
</tr>
<tr>
<td>Change (worsening)</td>
<td>Chronic low impact</td>
<td>Chronic high impact</td>
</tr>
<tr>
<td>Change (improving)</td>
<td>Chronic high impact</td>
<td>Chronic low impact</td>
</tr>
<tr>
<td>Change (resolution)</td>
<td>Chronic low impact</td>
<td>Chronic pain resolution</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Chronic low impact</td>
<td>Chronic low impact</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Chronic high impact</td>
<td>Chronic high impact</td>
</tr>
</tbody>
</table>

A focus on duration and impact privileges the individual. Chronic pain has an impact beyond the individual to other individuals, to society and to the economy. This duration-impact framework has been developed in the context of a major UK research programme investigating the psychosocial determinants of high-impact chronic pain funded by the Advanced Pain Discovery Platform. The APDP has a focus on determining the causal influences on the onset and maintenance of high- and low-impact chronic pain. The consortium is exploring determinants of pain-state transitions using existing databases such as ALSPAC, ELSA, UK BIOBANK, HWW, and HEAF, the synthesis of findings across published studies, and through new investigations. This framework is the first step in helping to clarify clinical and research questions. First, we need to understand how to manage the inherent uncertainty in the use of measurement technology designed to capture impact and establish how far what has already been measured corresponds with, or diverts from, this framework. Second, as we are interested in factors that are causally relevant to the onset, maintenance, and change in states over time, testing causal models needs to be carefully formulated. And third, this framework can direct the selection of appropriate endpoints for intervention in attempting to alter unwanted pain states. As important as pain offset (resolution) is the improvement in impact status, from high to low. A reasonable treatment outcome for many, and therefore a clinical endpoint, is to move from high-impact to low-impact chronic pain.10,11,36

5. Conclusion

We propose a framework for studying the biopsychosocial influences on the onset, maintenance, and change in of chronic pain state. In accepting and interrogating the common dichotomies of duration (acute, chronic) and impact (high, low), we recognize the challenges inherent in dichotomizing continuous and dynamic experience. Pragmatically, however, this allows us to propose 5 unique states of pain and 10 transitions. This framework promotes a consideration of impact over time on the person with pain and will enable investigation of the causal determinants of states and changes in state.

Conflict of interest statement

The authors have no conflict of interest to declare.

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References


