



## Review article

# Comparison of tools used to evaluate pain in surgery in the Czech Republic and abroad

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## Abstract

**Introduction:** Pain has accompanied man from time immemorial in many life events, from birth to death. Nowadays we have many ways to treat it. However, the right pain must be evaluated to get started. In order to obtain this information, a variety of measuring tools that focus on localization, intensity, the spread of pain, continuity with daytime, physical or psychological activity, or previous patient experience are used.

**Objective:** The aim of this paper is to find out which place the measuring instruments take in pain assessment in surgical patients, and to map the use of individual pain tools in the Czech Republic and the world.

**Methods:** The article was processed using an overview study. The keywords were entered into the EBSCO, PubMed, Medvik and Scopus databases. Further information has been sought in specialist monographs that deal with pain assessment in surgical patients or the use of appropriate pain-measuring instruments. Overall, 39 relevant sources were found.

**Results:** When assessing pain in a patient, it is always necessary to distinguish between acute and chronic pain. In the Czech Republic, the Visual Analogue Scale (VAS) or the Face Scale (FPS) is most often used. On the other hand, the individual scales are more interconnected according to the needs of the patient, and thus the health professionals receive far more information than using only one scale.

**Conclusions:** Nowadays measuring tools simplify the work of nurses and are an essential part of the nursing process. Despite the use of various measurement scales to evaluate pain, it is always necessary to keep in mind that each patient is individual and treats pain in a subjective way.

**Keywords:** Measuring tools; Nursing; Pain; Pain assessment; Pain in surgery

## Introduction

*"The effort to affect pain is as old as humanity itself. Pain relief has always been considered an ethical priority of the medical profession. Even in antiquity, the efforts to alleviate pain were attributed crucial and marked as divine"* (coll. of authors: All about treating pain, 2006, p. 9).

*"Pain is a phenomenon which lies between physiology and psychology"* (Křivohlavý, 2002, p. 80). According to Zacharová et al. (2007), pain can have positive and negative impacts. A person faces pain, fear or anxiety in many forms during their life. Lumley et al. (2011) define pain as a range of emotional experiences, because the level of pain is individual (variable) depending on the physical injury.

As stated by Rokyta et al. (2009), the cause of pain is multilateral. Many factors can participate in the cause of pain – chemical, biological or physical as well as mental (psychogenic pain). The etiology of specific pain is the base for symptoms and the subsequent treatment, which is specified according to the type of pain and a person's individuality.

Pain has many definitions. The WHO and the International Association for the Study of Pain (IASP) define it as *"unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage"* (Mersky and Bogduk, 1994, p. 210). Pain is relatively subjective and there is no such test that could exactly measure it. In the modern day, we have certain options to assess pain using certain criteria. The Joint Accreditations Commission issued standards for the evaluation, treatment and documentation of pain in 2011. For this reason, every medical institution must have tools for the evaluation of pain and they should be able to use them efficiently for the benefit of their patients (The Joint Commission, 2018).

The issue of pain appears in all fields of medicine. Pain in surgery is nothing unusual (acute, chronic or common post-surgical pain). According to Smart et al. (2008), post-surgical pain can be mild (e.g. post-laparoscopy), moderate up to 48 hours (e.g. post-appendectomy), moderate more than 48 hours (e.g. after cardiac surgery), severe up to 48 hours (e.g. post-cholecystectomy) and severe more than 48 hours (e.g. after larger surgeries of epigastrium, thorax or spine).

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Abdalahim et al. (2011) state that efficient post-surgical pain treatment shows the quality of care in a medical institution. Medical personnel should be able to use the correct methods for the treatment of pain, but most importantly they should be able to evaluate it correctly. Nurses' knowledge regarding the evaluation of post-surgical pain should be included in medical high-school education and broadened in practice with professional seminars.

## Materials and methods

To find information about the use of appropriate pain-measuring instruments, both in the Czech Republic and in the world, an overview study of documents was used. The keywords were entered into the EBSCO, PubMed, Medvik, Scopus databases and The Research, Development and Innovation Information System. We used the keywords: *pain, nursing, assessment pain, pain in surgery, measuring instruments*.

Overall, 209 relevant sources in mentioned databases were found. After the removal of inadequate sources, there were 86 relevant sources in EBSCO database, 63 sources in PubMed database, 30 sources in Medvik database and 30 sources in Scopus. Further information has been sought in specialist monographs that deal with pain assessment in surgical patients or the use of appropriate pain-measuring instruments (35 sources). Overall, 244 relevant sources were found. Subsequently, the sources that best map the issue of the use of appropriate pain-measuring instruments, both in the Czech Republic and in the world, were chosen. After the removal of duplicates, articles without full versions and materials, that were not directly related to the review of this article. Overall, 39 relevant sources were used.

## Results and discussion

### *The importance of measuring tools in nursing*

According to Vörösová et al. (2015), measuring tools are a necessary part of nursing practice because they simplify the nurses' job and objectify patients' problems. According to Sollár (2014), the tool presents the operationalization of theoretical concepts.

Measuring tools have a wide range of use. According to Hurley and Volicerová (2007), their use is recommended mainly regarding evaluation and diagnostics. Fortinash and Hoday-Worret (2008) and Tomagová (2010) have the same opinion. They state that the learned data using measuring tools not only help in differential diagnostics but they improve the diagnostic process in nursing as well. Bóriková and Žiaková (2007) and also Topinková et al. (2002) have a different opinion. They recommend using measuring tools mainly as complementary methods in acquiring general data about a patient.

Vörösová et al. (2015) see evaluation scales as an integral part of the nursing process. It is necessary to assess the needs of an individual, their family and community while providing nursing care. Besides the classical method of an interview, a nurse should acquire sufficient information using measuring scales. The use of these scales brings more objective data about a patient and a more holistic view (Vörösová et al., 2015). According to Sollár (2014), correctly selected tools are the connection between theory and evaluation.

Vörösová et al. (2015) state that evaluation scales are very important in the European countries, primarily in the USA, where they are used daily in nursing care. According to

Bendinger and Plunkett (2016), nurses abroad commonly use evaluation scales and modify them and adjust to their patients. There are generally more foreign publications which deal with the issue of measuring tools than Czech publications (Bellido-Vallejo and Pancorbo-Hidalgo, 2017; Haedtke et al., 2018; Song et al., 2015; Topham and Drew, 2017; Wells et al., 2008).

International professional organizations deal with creating and evaluating measuring tools. Primarily, they are Innovationen im Gesundheitswesen und angewandte Pflegeforschung (ICAP), Deutsche Netzwerk für Qualitätsentwicklung in der Pflege (DNQP), American Nurses Association (ANA) or Irish Nurses Midwives Organisation (INMO) (ANMC, 2005; Searle and Bennett, 2008; Vörösová et al., 2015).

### *Tools for measuring surgical pain in the Czech Republic and abroad*

According to Mann and Carr (2008), Rowbotham and Macintyre (2003), Rokyty et al. (2009), Sláma et al. (2016), Vörösová et al. (2015) and Zemanová and Zoubková (2012), the Czech Republic and other countries most frequently use the Visual Analogue Scale (VAS). According to Rokyta et al. (2009), a patient uses this scale to evaluate the subjective pain intensity using numbers, when 0 means no pain and 10 the most severe pain. Zemanová and Zoubková (2012) state that VAS does not have to use only numbers. Primarily in small children, the Faces Pain Scale is used due to their age. There are five faces, where the smiling face means no pain (0) and the frowning and crying face means severe pain (5). This scale can be used in patients with communication problems who are not capable of expressing their level of pain using the Numerical Rating Scale (NRS). In children up to one year, Neonatal/Infant Pain Score (NIPS) is used. Pain is assessed by a child's facial expression (Zemanová et al., 2007).

Mandysová et al. (2017) combined VAS and NRS with the Faces Pain Scale – Revised (FPS-R) and applied it to patients who had suffered a stroke. The results showed that the application (VAS/NRS) was very wide regarding patients in all medical fields. They recommend using VAS/NRS, FPS-R in patients who are able to co-operate. Similar research was carried out by Bahreini et al. (2015), who also used the combination of VAS, NRS and Colour Analogue Scale (CAS) in adult patients with acute pain. A similar combination of VAS and NRS was used by de Jong et al. (2015) in adults with burns. Most experts agree that a detailed assessment of pain requires the combination of VAS with other scales for the assessment of pain (Bahreini et al., 2015; de Jong et al., 2015; Mandysová et al., 2017). The combination of a few pain assessment scales is used very frequently in other countries (Bahreini et al., 2015; Bech et al., 2015; de Jong et al., 2015; Göransson et al., 2015; Mandysová et al., 2017). The results of the research of Göransson et al. (2015) that was carried out in 217 patients with acute pain at the ER in a Swedish hospital using VAS and NRS showed that patients found the numerical scale easier to use. The patients stated that this scale was much more understandable than VAS and better reflected their level of pain.

Bech et al. (2015) state that England uses the Verbal Rating scale along with VAS. This scale can be slightly misleading. Considering the fact that it is used in other countries as well (Bech et al., 2015; Briggs and Closs, 1999), such as Denmark, and works rather with a verbal description of pain, it is important to translate the description literally. Otherwise, the assessment of pain can be wrong.

Vörösová et al. (2015) state that for the localization of pain, we can use the so-called 'Pain Chart'. A patient uses a number to indicate the place and intensity of pain in a picture

of a figure. According to Nemcová (2009), the PQRST scheme can be used to assess pain as well (P = place; Q = quality, type of pain; R = radiation, spreading; S = severity, intensity; T = time, duration).

Rokyta et al. (2009) state that the questionnaire from McGill University (McGill Pain Questionnaire – MPQ) is also very frequently used in its shortened form. This questionnaire primarily deals with the type of pain and how the patient feels. 15 items which describe pain have been translated into Czech. They are the following types of pain: throbbing, shooting, stabbing, sharp, convulsive, gnawing, burning/stinging, dull, continuous, oppressive, touch sensitive, bursting, tiring/exhausting, vexing, terrible and torturous/cruel. According to the information of The Canadian Medical Hall of Fame (2018), this questionnaire (MPQ) has been the most used globally since 1975 after certain adjustments. It has been translated into 20 languages and it is currently recognized as a global standard in pain assessment.

According to Rokyta et al. (2009), an important part of pain assessment is also the way in which we are affected by pain during our daily activities. For this assessment, we use the Questionnaire for the Interference of Pain with Daily Activities (QIPDA). A patient assesses the restrictions in daily activities due to pain using a five-point scale: 0 – no pain, 1 – some pain but it is not an inconvenience and can be forgotten during an activity, 2 – some pain which cannot be forgotten during an activity but does not prevent the person from carrying out daily activities and working without errors, 3 – pain which cannot be forgotten and prevents a person from performing daily activities, which are carried out with difficulty and errors, 4 – pain which prevents a person from carrying out daily activities without a large effort, 5 – severe pain which prevents a person from carrying out daily activities; it forces them to search for a position of relief and even a doctor's treatment (Rokyta et al., 2009). According to Serle and Bennett (2008), other countries use a similar questionnaire which is focused on relief from pain during daily activities. It is the Brief Pain Inventory (BPI) and it is used more in patients with chronic pain than those with

acute pain. It uses a numerical scale (0–10). It shows the level of effect of pain in daily activities. It focuses mainly on mental areas, activities, walking, work and family relationships, sleeping and desire for life (Searle a Bennett, 2008).

Knotek (2005) states that the used questionnaires for the assessment of pain can include the revised Coping with Pain questionnaire (CPQ-R), which includes the following scales: Monitoring pain, Closure and Resignation. This updated version has a revised scale of Monitoring pain. The CPQ-R questionnaire helps to assess the progress of coping with pain. The Monitoring pain scale shows only pain, Closure is primarily related to anxiety or depression. Resignation reflects a serious level of anxiety, anger or problems at work or in the family and painful behaviour. Prevention mainly includes drawing attention away from pain, correct verbal or non-verbal communication and a sufficiently positive approach of medical personnel (Knotek, 2005).

## Conclusions

The results show that although a nurse carries out a complex and systematic patient assessment with relevant tools and scales, the reality is very different, especially in the Czech healthcare. The main problem is the minimal inclusion of tools in complex nursing care. In foreign countries, the use of assessment tools is a common practice in institutional and home care.

The mentioned data of most authors show that pain assessment is an important thing and it should be included in every medical institution. When we assess pain, we assess the intensity, type, associated factors or its duration. It is also important to connect pain assessment to physical examination and the detailed pain anamnesis. It is good to use numerical or verbal scales or a questionnaire, and even the patient's subjective perceptions and previous experience with pain.

It is always important to distinguish acute pain from chronic pain, as shown in Table 1.

**Table 1. The most frequently used assessment scales of pain**

Title	Abbreviation	Description	Use
Visual Analogue Scale	VAS	pain assessment on a line segment	adult patients with acute pain
Faces Pain Scale	FPS	pain assessment by five-face scale	paediatric patients, patients with a lower level of communicative skills, after a stroke
Neonatal/Infant Pain Score	NIPS	pain assessment by a child's facial expression	paediatric patients up to 1 year
Coloured Analogue Scale	CAS	pain assessment using a colour scale	paediatric patients up to 5 years and older
Numerical Rating Scale	NRS	pain assessment using the numerical scale 0–10	adult patients with acute pain (burns)
Verbal Rating Scale	VRS	verbal objectification of pain intensity	adult patients with acute or chronic pain
Pain Chart	–	assessment of the localization of pain using drawing into a picture of a figure	adult or paediatric patients with acute or chronic pain
Pain Assessment Method (PQRST questionnaire)	PQRST	assessment of place, localization, type, character, spreading, intensity and duration of pain	adult, communicative patients with acute or chronic pain
McGill Pain Questionnaire (McGill University Questionnaire)	MPQ	assessment of pain character and a patient's feelings during pain (includes 15 assessment items)	conscious adult patients with chronic pain
Questionnaire for the Interference of Pain with Daily Activities	QIPDA	pain assessment regarding the restrictions in daily activities using a five-point scale	adult patients with chronic pain

**Table 1. (Continued)**

Title	Abbreviation	Description	Use
Brief Pain Inventory	BPI	assessment of the level of the impact of pain on daily activities in certain areas	adult patients with chronic pain
Coping with Pain Questionnaire	CPQ-R	assessment of the progress of coping with pain	conscious adult patients with acute or chronic pain
Leeds Assessment of Neuropathic Symptoms (Screening questionnaire for recognizing neuropathic pain)	LANSS	pain assessment in patients with neuropathy	adult patients with chronic pain

The results show that it is convenient to use the Verbal Rating Scale (VRS), Visual Analogue Scale (VAS) or Numerical Rating Scale regarding acute pain. Meanwhile, the McGill Questionnaire, Brief Pain Inventory (BPI) and Leeds Assessment of Neuropathic Symptoms and Signs are used more regarding chronic pain.

In the Czech Republic, the most frequently used is the Visual Analogue Scale (VAS) or Faces Pain Scale (FPS). Foreign countries more frequently connect individual scales according to a patient's needs and gain much more information.

In conclusion, we can say that the most efficient way of assessing pain is the combination of several scales according to a patient's age and pain type.

### Conflict of interests

The authors have no conflict of interests to declare.

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## Porovnání nástrojů sloužících k hodnocení bolesti v chirurgii v České republice a zahraničí

### Souhrn

**Úvod:** Bolest provází člověka odnepaměti při mnoha životních událostech – od narození až po smrt. V dnešní době máme mnoho způsobů její léčby. K tomu, aby však patřičná léčba mohla být zahájena, je zapotřebí správně bolest zhodnotit. K získání těchto informací pomáhají zdravotníkům různé měřicí nástroje, které se soustřeďují na zhodnocení místa, intenzity, šíření bolesti, spojitost s denní dobou, fyzickou či psychickou aktivitou nebo předchozí zkušenosti pacienta.

**Cíl:** Cílem tohoto příspěvku je zjistit, jaké místo zaujímají měřicí nástroje v rámci hodnocení bolesti u chirurgických pacientů. Dále pak zmapovat využití jednotlivých nástrojů na bolest v České republice a ve světě.

**Metodika:** Pro zpracování předložené publikace byla využita metoda obsahové analýzy dokumentů. Vyhledávání bylo realizováno pomocí klíčových slov, která byla zadána do databází EBSCO, PubMed, Medvik a Scopus. Další informace pak byly vyhledávány v odborných monografiích, které se zabývají možnostmi hodnocení bolesti u chirurgických pacientů či využití vhodných měřicích nástrojů k monitoraci bolesti. Celkově bylo využito 39 odborných zdrojů.

**Výsledky:** Při hodnocení bolesti u pacienta je vždy potřeba rozlišit, zda se jedná o akutní, či chronickou bolest. V České republice se nejčastěji pracuje především s Vizuální analogovou škálou (VAS), popřípadě Škálou obličejů (FPS). Oproti tomu v zahraničí se více propojují jednotlivé škály podle potřeb pacienta a tím tak zdravotníci získávají daleko více informací než s použitím pouze jedné škály.

**Závěr:** Měřicí nástroje v dnešní době zjednodušují práci sester a jsou nezbytnou součástí při realizaci ošetrovatelského procesu. Navzdory využití různorodých měřicích škál k hodnocení bolesti je vždy potřeba mít na paměti, že každý pacient je individuální a k hodnocení bolesti přistupuje subjektivně.

**Klíčová slova:** bolest; bolest v ošetrovatelství; hodnocení bolesti; měřicí nástroje; ošetrovatelství

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