

# Clinical Doctorate in Paediatric Dentistry (DDent)

## Non-procedural Pain Management in Paediatric Dental Patients

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## Declaration

This report entitled “Non-procedural Pain Management in Paediatric Dental Patients” was composed by me and is based on my own work. Where the work of others has been used, it is fully acknowledged in the text and in captions to table illustrations. This report has not been submitted for any other qualification.

Dakila A. Alkattan

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## **Covid-19 Pandemic Impact Statement**

Due to the COVID-19 second wave restrictions at the beginning of the investigator's enrolment as a DDent student, which included limited and restricted access to university campus and labs, the topic and scope of the project was changed and adjusted several times to adapt with the uncertainty associated with the pandemic. By the time a consensus was reached in regard to the title and scope of this project in light of the pandemic circumstances, the 1<sup>st</sup> draft of the project protocol was not submitted until the end of the 1<sup>st</sup> academic year of the postgraduate student (investigator). The uncertainty associated with the pandemic and the pauses in formulating a clear protocol caused the delays in the application for ethical approval which eventually reflected on the scope and inclusion criteria of this project.

## Abstract

**Introduction:** Efforts to improve pain management in children have included approaches to standardize and advance the use of validated pain measurement tools and encourage comprehensive assessment. The discrepancy between improvements in pain assessment practices and pain management outcomes suggests that translation into clinical practice may have failed. Non-procedural pain management approaches are not standardized, or individualized. Even though there are different validated tools to scale and assess pain, these tools are not serving their main purpose, which is giving better outcomes in pain management practices, especially in a time where management of non-procedural pain is paramount.

**Aims and objectives:** The first part of this project consisted of a scoping review on the non-procedural pain management in paediatric patients; to establish how non-procedural pain is managed in paediatric patients, reflect on the research and literature gaps that could be considered as an opportunity for future exploration and studies. Moreover, we aimed to explore how non-procedural pain is managed in different healthcare settings and how these practices can be applied and employed in the paediatric dental setting. The second part of this project involved qualitative interviews to understand the views of paediatric dentists on non-procedural pain assessment and management.

**Methodology:** The eligibility criteria for the scoping review on non-procedural pain management in paediatric patients was based on Participants, Concept, and Context (PCC) between 2015 – 2022. Participants were healthcare workers caring for children under the age of 17 years, and studies included children under the age of 17 with non-procedural pain. The scoping review focused on the assessment and management of pain before delivering any treatment (medical or dental) in children.

A qualitative study was conducted in 2023, investigating the views of paediatric dentists on non-procedural pain assessment and management. The participants included consultants, specialists, registrars, speciality trainees. The exclusion criterion were dentists with less than a year of previous experience in delivering dental care to paediatric patients. The 14 participants who were asked questions addressed the following themes: the dentist's perception of the need and the importance of a baseline pain assessment prior to dental treatment, challenges in obtaining an appropriate non-procedural pain assessment, challenges in decision making of non-procedural pain

management practice, and perception on how well parents/carers are managing pain at home.

**Results:** The scoping review resulted in 15 titles eligible for this review. Five studies were conducted in the UK, 4 studies in Italy, 2 in the US, 2 in India, 1 in Germany, and 1 in Canada. Included studies ranged from reviews, retrospective studies, clinical trials, retrospective observational study, exploratory study, cross sectionals, and pilot studies.

The qualitative interviews reflected the different layers of the perception and management of the paediatric dentist in practice. They are aware of how important and effective non-procedural pain assessment and management can be with children and their caregivers yet face different challenges in real life practice due to the subjective nature on non-procedural pain. This research aims to improve the care and management of pain in children before they receive actual treatment by emphasising the need for an individualised patient-centred care that will focus on every child's need and their parents.

**Discussion and Conclusion:** the scoping review highlighted the scarce literature on non-procedural pain management in children. Different approaches were proposed in different domains to manage non-procedural pain, including two pilot studies with unclear results, and a randomised clinical trial with no results provided. Policies and frameworks trialled to lessen visits to emergency departments by better managing non-procedural pain. Pharmacological and non-pharmacological management were also considered effective, with non-pharmacological management being more effective on decreasing the level of anxiety than the intensity of pain. It has been shown that tele-dentistry can be used as a valuable patient management strategy.

The qualitative study reflected that paediatric dentists were not interested to use any of the current validated pain assessment tools with children in exception to the Numeric pain Rating Scale (NSR). The overall perception was that pain was subjective and it is challenging for children to express pain accurately. Moreover, pain assessment is a holistic approach of pain history, clinical presentation, clinical and radiographic examination. Paediatric dentists are familiar with the practice of giving patients and their parents non-procedural pain management such as instructions of how to manage pain at home with diet, hygiene, pharmacological management,

behaviour management, and/or exercises that will help to ease pain. More studies are needed on the effectiveness of these instructions and how to improve them to better assess the validity of non-procedural pain management.

## Key Words

Non-procedural Pain, Dental pain in children, Odontogenic Pain, Pain Assessment

## List of Abbreviations

Abbreviation	Description
A&E	Accident & Emergency Department
AAPD	American Academy of Pediatric Dentistry
ACC	Anterior Cingulate Cortex
AGPs	Aerosol Generating Procedures
C-OIDP	Child Oral Impacts on Daily Performances
CAS	Colour Analogue Scale
CBT	Cognitive Behavioural Therapy
CG	Control Group
CINAHL	Cumulated Index to Nursing and Allied Health Literature
COHIP	Child Oral Health Impact Profile
COVID-19	Coronavirus Disease 2019
CPQ	Child Perceptions Questionnaire
DDQ	Dental Discomfort Questionnaire
EBSCO	Elton B. Stephens CO (company)
FLACC	Face, Leges, Activity, Cry, Consolability
FPS-R	Faces Pain Scale – Revised
GDPs	General Dental Practitioners
HRA	Health Research Authority
IASP	International Association for the Study of Pain
IBS	Irritable Bowel Syndrome
IC	Insular Cortex
IND	Intranasal Diamorphine
INF	Intranasal Fentanyl
LA	Local Anaesthetic
MIH	Molar Incisor Hypomineralisation
NatCen	The National Centre for Social Research
NDEP	National Dental Epidemiology Programme



NHS	National Health Service
NHS REC	National Health Service Research Ethics Committee
NRS	Numerical Rating Scale
OHRQOL	Oral Health Related Quality of Life
OIDP	Oral Impact on Daily Performance
PCC	Participants, Concepts, and Context
PHE	Public Health England
PICo	<b>P</b> opulation, <b>I</b> nterest, <b>C</b> ontext
PIF	Participant Information Form
PIPER	Piacenza Paediatric Emergency Room
PRISMA-ScR	PRISMA Extension for Scoping Reviews
RAP	Recurrent Abdominal Pain
SARS-CoV-2	The Novel Coronavirus
SB	Soap Bubbles
SC	Standard Care
SCD	Sickle Cell Disease
SOHO-5	Scale of Oral Health Outcomes
SRA	Social Research Association
SSOU	Short-Stay Observation Unit
TMJ	Temporomandibular Joint
UCL	University College London
UCLH	University College London Hospital
UK	United Kingdom
USA	United State of America
VAS	Visual Analogue Scale
WBPRS	Wong-Baker Faces Pain Scales

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# 1. Chapter One: Introduction

## 1.1 Pain and its definition

The most common complaint from patients encountered by health practitioners is pain and it continues to be the main reason in seeking healthcare services. In the UK, 30-50% of the population are affected by chronic pain (Fayaz et al., 2016). In the USA, over 60 million trauma associated pain episodes occur per annum, as well as acute pain related to more than 40 million surgical treatments (Sinatra, 2010). The International Association for the Study of Pain (IASP) has revised the definition of pain as “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.” (Raja et al., 2020).

Another definition highlighting the subjective nature of pain, “pain is whatever the experiencing person says it is, existing whenever the experiencing person says it does;”. However, the incapability of infants, younger children, and those with cognitive impairments to communicate does not contravene the likelihood of that individual being in pain and in need of proper pain relief (Manworren and Stinson, 2016).

## 1.2 Pain in children

Pain is both a concrete experience and an abstract concept. Children’s understanding of pain and their ability to describe it changes in a predictable developmental order. The understanding of pain causation appears to progress from the child being unable to verbalize a reason why pain hurts, to verbalizing a general, usually external cause of the pain, and finally including physiological or psychological causes (Versloot and Craig, 2009).

The comprehension of pain that stimulates a child’s response is affected by various emotional and psychological factors (Pancekauskaitė and Jankauskaitė, 2018). To understand the elements affecting the management of pain in children, more information is needed about how parents and clinicians measure a child’s pain. In a cross-sectional study that involved 243 children aged 3–15 years treated in the Accident & Emergency Department (A&E) at Bergen, Norway, paediatric patients commonly received less pain relief than adult patients with the same injury or illness. The A&E considerably underrated the experienced pain in those children. This was related to all types of medical encounters with paediatric cases involving fractures

showing particularly large differences. In similar cases, it is necessary to tackle the stress and anxiety in the child along with providing the suitable relief from pain. It is surprising that even with the improvement of pain assessment tools, less than 50% of paediatric patients with severe pain in the A&E have received any form of prescribed analgesics. More studies are needed to identify the reason why physicians continue to give inadequate relief from moderate and severe pain (Brudvik et al., 2017).

Moreover, due to the subjectivity, privateness and the fact that it is internal, pain is difficult to be visually observed and measured by another individual accurately and there is a great discrepancy between observational scales and self-report measures. For that, it is recommended to use self-reported visual-analogue scales in documenting paediatric pain (O'Donnell et al., 2007).

Paediatric dentists are aware of the significance of children's pain perception in the dental treatment and commonly do not feel equipped to identify a child in pain, which is dependent upon the dentists' experience and age (Daher et al., 2015).

### **1.3 Physiology of Pain**

Pain can be nociceptive (arising from activation of nociceptors due to actual or threatened damage to non-neural tissue), neuropathic (pain caused by a lesion or disease of the somatosensory nervous system), or mixed (both nociceptive and neuropathic). Nociceptive pain is further subdivided as somatic (bone, muscle, joint, skin or connective tissue) or visceral (organs such as stomach and pancreas). Nociceptive pain quality is usually described as sharp or aching sensation, well-localized or diffuse. Neuropathic pain quality is usually described as a burning or shooting sensation and may be associated with heightened sensitivity to stimuli (allodynia) or abnormal sensations (paraesthesia and dysesthesia). (Manworren and Stinson, 2016).

The maxillary teeth are innervated by branches from the superior alveolar nerves, and the inferior alveolar nerves innervate the mandibular teeth. When nociceptive signals arise from these areas, the first-order neurons are triggered, and the signal is transported along the central processes of the nerve, which enter the pons. When they enter the brain stem, they turn caudally and descend within the brain stem,



where the signals are referred to the second-order neurons. From there the signal is sent up to the thalamus and finally to different areas of the brain. The brain does not seem to have a specific 'pain centre'; rather, pain perception is the sum of activity in several areas in the brain. Activity in the somatosensory cortex, S1 (primary) and SII (secondary) handles sensory discriminative information, whilst IC (insular cortex) and ACC (anterior cingulate cortex) mediates affective-motivational information (Berlin et al., 2019) see (Figure 1.3.1).

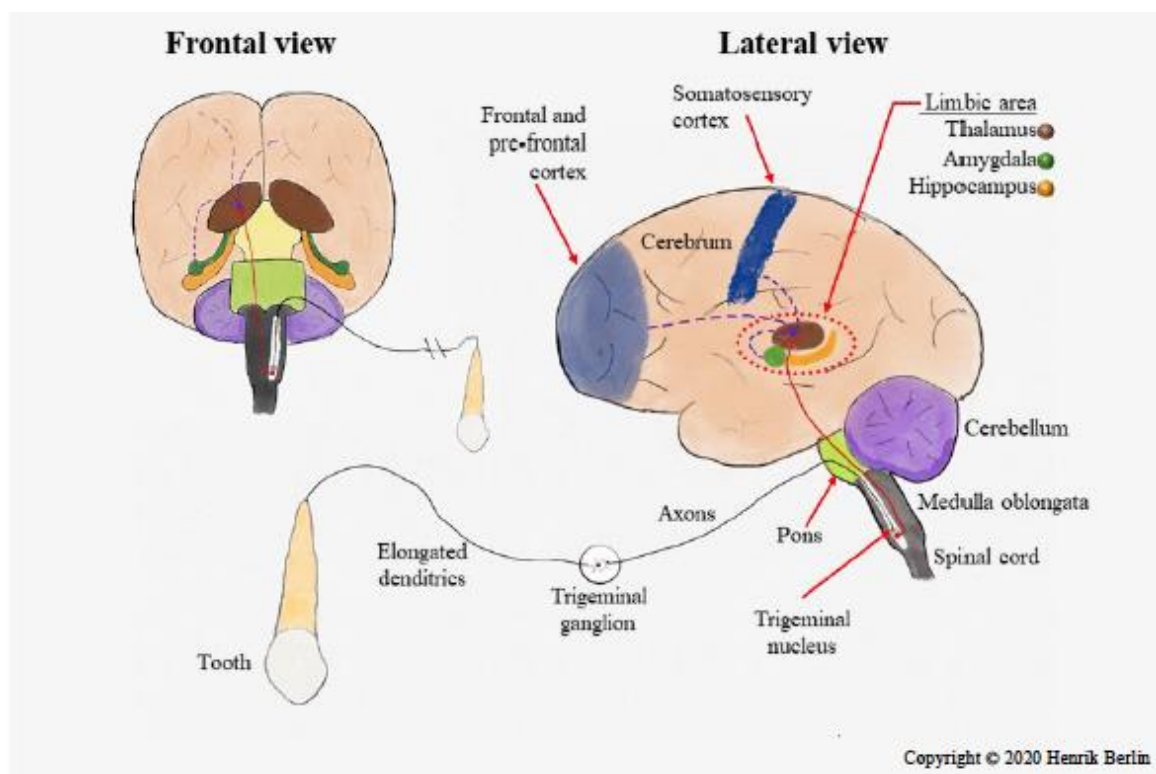


Figure 1.3-1 Schematic illustration of the pathway of pain

## 1.4 Background and Rationale

### 1.4.1 Dental Caries in Children

The prevalence of dental pain among school children was reported by the Public Health England (PHE) National Dental Epidemiology Programme (NDEP) in the survey collected in the 2021/2022 school year, that 35.1% of 5-year-old children in more deprived areas experienced dental caries compared to 13.5% in less deprived

areas, with the mean of 3.5 carious teeth. This the 1<sup>st</sup> time in the history of the 5 year old survey series that the enamel decay is reflected, this is critical to point out the children in the early stage of decay who were previously counted as caries free. The relevance of this survey is not the number of children with caries as the majority of the surveyed 5-year-olds did not have caries but the severity of those who have been detected with caries. The prevalence also varies largely with different geographical areas, ethnicity, and level of deprivation (PHE, 2022).

Moreover, the Public Health England (PHE) National Dental Epidemiology Programme (NDEP) surveyed 3-year-old children between 2019 to 2020. Data collection was affected by the outbreak of the novel coronavirus (COVID-19) infection and the closure schools and nurseries in England in March 2020, which led to termination of the survey and the final 3 months of data collection were lost. However, over 19,400 children at the age of 3 have already participated in the survey across the country allowing estimates of prevalence and severity of disease. Experience of dental caries includes carious teeth as well as missing teeth or filled secondary to caries. Of the 3-year-olds participating in the survey, 10.7% already had experience of dental caries with an average of 3 teeth affected despite having had their primary molars for just a couple of years or less. Among the 10.7% of children with experience of dental decay (PHE, 2021). Prevalence also differs extensively between countries: from 9% to 40% worldwide (Guskuma et al., 2017). Dental caries and their consequences are often associated with emergency visits to the dentist and since prevalence is higher in deprived populations with less access to dental services, therefore, children with less access to care are more likely to have extensive, and more painful carious lesions (Guskuma et al., 2017)

#### 1.4.2 Pain and Dental Caries in Children

Studies have shown that dental pain is a common experience, not due to its high prevalence but due to the severity of the pain and how it impacts the quality of life, making it an issue of public health (Barrêto et al., 2009, Boeira et al., 2012, Moura-Leite et al., 2008). Pain of dental origin impacts the quality of sleep, impairs nutrition, school attendance, and stresses the daily lives of parents and caregivers (Boeira et al., 2012, Shepherd et al., 1999). In children, the main cause of dental pain is

unrestored dental caries, followed by trauma and exfoliation of primary teeth (Tickle et al., 2012, Boeira et al., 2012).

The use of oral health-related quality-of-life (OHRQoL) measures has been the most popular in measuring caries related impact. These questionnaires seek self-reported quantitative data relating to oral symptoms, functional limitations, and social and emotional well-being. The most used child measures include: Child Oral Impacts on Daily Performances (C-OIDP), Child Oral Health Impact Profile (COHIP), Child Perceptions Questionnaire (CPQ), Scale of Oral Health Outcomes (SOHO-5). In the main, these have presented enough evidence that children and adolescents with caries have more frequent negative impacts than those without the disease (Gilchrist et al., 2015).

Dental caries is often detected at a late stage when the lesion has cavitated and so be easily detected on examination. At this point, improvement of oral health to avoid development of pain can only be improved after definitive dental treatment. However, it is critical to emphasise that a proportion of these children will not be seen at a routine dental visit but will instead attend in pain and as an emergency. Therefore, the assessment of pain especially in preverbal children and pre-schoolers is critical. For this, pain assessment using a standardized tool is needed to effectively triage and prioritize patients so that the appropriate treatment can be given in a timely fashion with the available resources (Rosli et al., 2018).

Dentists may not be good at assessing pain in children. Dentists are usually focussed at reading the cues and responses from their patients' during treatment in order to be sure the experience to be painless as possible and be ready to stop if it starts to cause significant pain. However, they may not be as good at detecting or understanding non-procedural pain. (Murtomaa et al., 1996) reflected that dentists' usually do not ask their paediatric patients about general, non-procedural pain but instead will tend to report only procedural pain. Even reporting of procedural pain may tend to underestimate the pain felt by the child. (Versloot et al., 2004) studied the assessment of pain by the patient (child), dentist, and independent observers during the administration of local anaesthetic injection for dental treatment in children aged between 4 to 8 years in Amsterdam. Dentists assessed the pain considerably lower than the children and independent observers did. The dentists believed the

child to be distressed rather than experiencing pain at that moment. A significant correlation was found between the child's self-reported pain and the pain as assessed by independent observers. There was a moderate correlation between the amount of distress and pain intensity as reported by the child during the anaesthesia phase.

Dental pain is also common in children with cognitive disabilities due to numerous reasons, including: (i) reduced oral hygiene; (ii) the higher experience of dental caries; (iii) unmet treatment needs; and (iv) the higher prevalence of malocclusion than those without disabilities. Still, their first dental visit is mostly when symptoms are triggered at an older age than other children. Studies show that dental treatment needs, and dental pain are frequently neglected and that the level of pain level in this population is significantly underestimated (Senirkentli et al., 2021). Therefore, children with cognitive difficulties are more likely to have inadequate pain management leading to further decline in the quality of life and aggressive behaviour. Because children with cognitive disabilities may have difficulty understanding and reporting their pain, so behavioural indications will help with pain assessment (Senirkentli et al., 2021)

### 1.4.3 Other Orofacial Pain in children

#### 1.4.3.1 *Pain from the Temporomandibular Joint:*

In a Norwegian study including a total of 957 adolescents ages of 14, 16 and 18 years. All participants answered a survey during their routine clinical appointment. Over 47% reported Temporomandibular Joint clicking which was significantly higher in females, and around 2% reported pain with mouth opening. The study also reported the 57% of the participants using over the counter pain medications (Anne et al., 2023).

Another longitudinal study conducted in Sweden with 59 children diagnosed with Juvenile Idiopathic Arthritis showed an increased incidence of temporomandibular deformities in paediatric patients self-reporting TMJ pain and dysfunction. Although this self-reported pain was not predictive of difference in TMJ status on the long run. There was an association with a smaller maximum unassisted mouth opening, TMJ pain on palpation, and TMJ crepitations, but muscle pain on palpation was not

correlated with TMJ deformities even though it was common. Predictive of finding TMJ deformities was number of years with disease and a smaller unassisted mouth opening (Collin, 2023).

In Italy, a case series of 300 paediatric patients with myofascial pain who were divided into two groups. First group of 150 patients with both intra and extra articular disorder and the second group of 150 patients with only extra articular disorder. All participants received masticatory therapy through passive aligners and biofeedback exercises for four months. A full pain assessment of all the participants was conducted through a VAS and a muscular palpation test throughout the treatment, as well as nuclear magnetic resonance of the temporomandibular. The treatment considerably reduced the pain in all patients within 4 months according to the used pain assessment tools, without pharmacological intervention. The improvement in pain did not depend on a change in the condition between the articular condyle and the disc (Macrì et al., 2023).

#### *1.4.3.2 Pain from oral soft tissue lesions*

The impact of Recurrent Aphthous Ulcer on the quality of life of 12 and 15 year olds children in Thailand was done in one study. A nationwide survey was performed. Child Oral Impact on Daily Performance (Child-OIDP) and (OIDP indices) were used in 1,100 of 12 year old participants and 871 of 15 year old participants. The RAS-related impacts on daily performance were reported in 24.7% of 12 and 36.2% of 15-year-olds. Females were more likely than males to report RAS-related impacts. RAS was ranked 2<sup>nd</sup> for 12 and first for 15-year-olds from all the observed causes of oral impacts. Moreover, 79.8 of 12-year-olds and 86.8% of 15-years-olds had impacts on eating, 81.0 of 12-year-olds and 84.4% of 15-years-olds on cleaning teeth and 51.7 of 12-year-olds and 60.3% of 15-years-olds on emotional stability (Krisdapong et al., 2012).

A study in Sweden explored paediatric patient's and parent's experiences with oral mucositis treatment and how accurate the parents' perceptions reflected their child's perception. Around 71 surveys were completed by the parents of children who received hematopoietic stem cell transplantation, along with 38 surveys completed by paediatric patients who aged 7 years old or above. Parents and paediatric patient self-reports showed an agreement that were good to excellent, which was reflected

as 86% of the parents and 83% of the patients reported oral pain and 44% of the parents and 47% of the patients reported difficulty swallowing often or very often (Kamsvag-Magnusson et al., 2014).

#### 1.4.4 Assessment of Pain in Children

Pain measurement tools emphasise on the intensity of pain aiming on the quantity, and extent of pain. Whereas, pain assessment tools encompasses clinical decision based on observing the nature, implication and context of the child's pain experience making it a broader concept (Finley and McGrath, 1998).

The first step to properly manage pain is pain assessment. It is important to assess the level of pain in patients' to better decide the best pain management practice. Afterwards, the effectiveness of these practices should be evaluated if they were sufficient enough to manage the previously assessed pain level, as patients may respond differently to specific measures (Nutter, 2010, Oakes and BC, 2011, Manworren and Stinson, 2016).

There are different scales for pain assessment and there is no one scale that is suitable for all age groups and types of pain (Manworren and Stinson, 2016, Stinson et al., 2006). There are two main categories in pain scales: self-report tools and observational tools.

##### 1.4.4.1 *Self-report tools*

Self-report tools are more favourable for pain assessment, since the experience of pain is a subjective experience and can only be explained by the individual experiencing it. However, this tool is only beneficial with children who have reached an appropriate level of cognitive developmental to correctly reflect their pain experience. Such tools need abilities such as quantification, classification and matching to accurately report the intensity of pain (Huguet et al., 2010, Jain et al., 2012, Freund and Bolick, 2019).

There are two types of self-report tools: (i) facial expression scales, and (ii) visual and numeric scales. The Faces Pain Scale – Revised (FPS-R) (Hicks et al., 2001),

and the Wong-Baker Faces® scale (Wong-Baker-FACES-Foundation, 2018) are examples of facial expression scales. The Faces Pain Scale – Revised has been translated into several languages (IASP, 2018). The Visual Analogue Scale (VAS) is an example of a visual/numeric scale, which has been used in both social and behavioural phenomena (quality of life, mood, stress) for over a hundred years. In the VAS scale, a 10cm horizontal line starting with a 'No Pain 0' point in the left and a 'Worst Possible Pain 100' point in the right. A mark on the horizontal line is marked by the patients based on the intensity of the pain. The distance between the starting left point to the mark calculates the VAS score in millimetres. Mild to moderate pain is somewhere between 35 and 60mm (Berlin, 2020).

Other pain assessment scales used with paediatric patients include the Numerical Rating Scale (NRS) and the Colour Analogue Scale (CAS) among others. The NRS resembles the VAS but uses numerical values in a stepwise fashion. It is a useful tool for older children and children with autism spectrum disorders (Bandstra et al., 2012). The CAS is a plastic tool with a slider, a wedge-shaped graduated figure on one side, a number scale on the other (Figure 1.4.3.2.1). The child is instructed to move the slider to the area that show how much pain they are experiencing, ranging from no pain in the bottom pointed side of the wedge shaped and the worst pain on the top flat base of the wedge for the worst pain (Tsze et al., 2013).

The VAS has also been used as a pain assessment tool and has shown its validity and reliability for patients over 8 years old (Chou et al., 2016, McGrath, 1993, McGrath et al., 1996, Bailey et al., 2012). Though, some research recommends its use from the age of 6 years old (Castarlenas et al., 2013). Both the CAS and the FPS–R has been shown to be effective in patients as young as 4 years old (Tsze et al., 2013). It is important to use graphic pain scales such as the FPS–R or Wong-Baker® FACES in young children, and self-reporting scales can also be used with young children from 3-year-olds but only to supplement the graphical ones (Berlin, 2020).

Moreover, of 30 available paediatric self-report pain intensity measures, only 6 have well-established psychometric properties, including evidence of reliability, validity, clinical utility, and feasibility for use with children and adolescents with acute and

chronic pain (Table 1.4.3.1.1). No single pain intensity scale is reliable and valid across all paediatric age groups or types of pain (Manworren and Stinson, 2016).

Table 1.4.4.1.1 (Manworren & Stinson, 2016)

Tool (Acronym)	Age Range	Type of Pain	Comments
Adolescent Paediatric Pain Tool (APPT)	8+	Acute and chronic pain.	Validated to assess pain intensity, pattern or timing, location (using a body drawing), and quality of pain is reported by the patient indicating or circling sensory, affective, evaluative, and temporal words.
Faces Pain Scale- Revised (FPS-R)	4-12 years old		Highly feasible. Neutral anchors.
Numeric Rating Scale (NRS)	8+		Highly feasible and therefore preferred by clinicians but not children, even older children when asked to prefer one of the faces scales.
Oucher	3+		Available with photographs of different races/ethnicities to facilitate cultural competency. Colour copies needed making feasibility moderate.
Visual Analog Scale (VAS)	8+		Moderate feasibility due to need to mark across 10 cm. line and then measure from 0 to mark. This also makes it more difficult to clinically track over time. Often used in research
Wong-Baker FACES Pain Scale (WBPRS)	3+		Validated with 0-5 & 0-10. Anchors. Anchor faces are smiling and crying tears which may confuse measurement of intensity and affect.

#### 1.4.4.2 Observational tools

Pain assessment using observational tools becomes a must with patients who are not able to self-report due to factors such as young age, cognitive impairment, or high distress level. Observational tools rate behaviours of distress in children that are believed to indirectly measure pain as crying, facial expression and body movement. The limitation with these tools is with their difficulty in differentiating pain from other behaviours arising from distress or discomfort. This means that pain assessment tools that depends on these behaviours are often lower in specificity and sensitivity when compared to self-reporting (Oakes and BC, 2011, Jain et al., 2012, Berlin, 2020).

The FLACC (Face, Legs, Activity, Cry, Consolability) is an example of an observational tool which is usually used to assess acute procedural and postoperative pain in ages starting from infancy to older children who are incapable of verbalising their pain using a self-report tool for any reason. Each parameter (face,



legs, activity, etc.) is graded on a scale from zero to two. Then the grades for each parameter are totalled, creating a full scale ranging from zero to ten (Berlin, 2020) see (Figure 1.4.3.2.1).

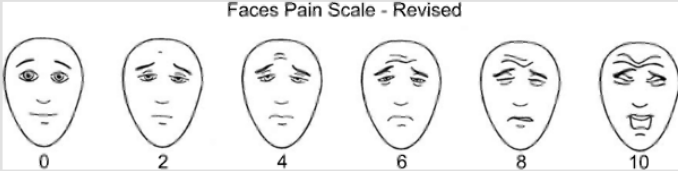
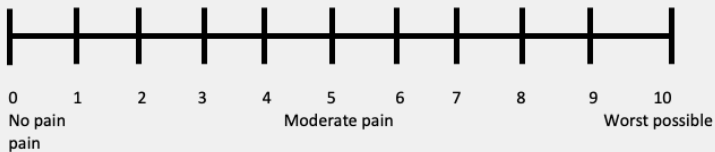
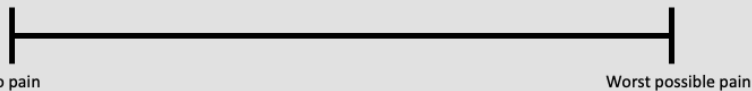

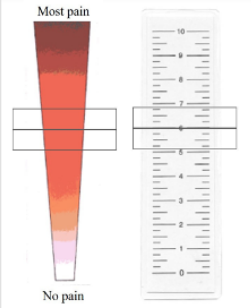
Type of Scale	Description																								
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NRS Numeric Pain Rating Scale																									
VAS Visual Analogue Scale																									
Wong – Baker FACES Pain Rating Scale																									
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FLACC Face, Legs, Activity, Cry, Consolability	<table border="1"> <thead> <tr> <th>Behaviour</th> <th>0</th> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>Face</td> <td>No particular expression or smile</td> <td>Occasional grimace or frown, withdrawn, disinterested</td> <td>Frequent to constant quivering chin, clenched jaw</td> </tr> <tr> <td>Legs</td> <td>Normal position or relaxed</td> <td>Uneasy, restless, tense</td> <td>Kicking or legs drawn up</td> </tr> <tr> <td>Activity</td> <td>Lying quietly, normal position, moves easily</td> <td>Squirming, shifting, back and forth, tense</td> <td>Arched, rigid or jerking</td> </tr> <tr> <td>Cry</td> <td>No cry (awake or asleep)</td> <td>Moans or whimpers; occasional complaint</td> <td>Crying steadily, screams, sobs, frequent complaints</td> </tr> <tr> <td>Consolability</td> <td>Content, relaxed</td> <td>Reassured by touching, hugging or being talked to, distractible</td> <td>Difficult to console or comfort</td> </tr> </tbody> </table>	Behaviour	0	1	2	Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw	Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up	Activity	Lying quietly, normal position, moves easily	Squirming, shifting, back and forth, tense	Arched, rigid or jerking	Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams, sobs, frequent complaints	Consolability	Content, relaxed	Reassured by touching, hugging or being talked to, distractible	Difficult to console or comfort
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Figure 1.4.4.2-1 Different types of pain assessment scales often used in a paediatric context (Berlin, 2020)

In dentistry the Dental Discomfort Questionnaire (DDQ) can be used. This was developed based on the evidence that pain secondary to caries distresses the quality of life of children and, consequently changes children's behaviour (Versloot et

al., 2006). The DDQ lists specific behaviour often associated with odontogenic pain in children: for example, crying during mealtime, problems chewing or problems with brushing teeth. Studies that tested the validity of the DDQ reflected that the behaviours included in the questionnaire were observed more in paediatric patients who are experiencing odontogenic pain and caries than in paediatric patients with only caries or in paediatric patients without caries or odontogenic pain. Moreover, the same studies also reflected that upon completion of dental treatment, most the behaviours assessed in the DDQ have decreased or no longer observed (Versloot et al., 2006).

There is a gap between evidence-based recommendations for pain assessment and current clinical practice in paediatric dentistry. Only 57% of U.S. paediatric dentistry residency directors report that pain is routinely assessed using quantifiable scales at all types of appointments in the training clinics they oversee. It is unknown how often pain is measured during procedures, versus only during review of symptoms. Pain assessment behaviours by dentists in clinical practice have not been comprehensively described in the literature, but there likely is even less consistency than observed in training settings (Randall et al., 2020).

#### 1.4.5 Paediatric dentistry and the novel Coronavirus (COVID-19)

In 2019 the novel Coronavirus (SARS-CoV-2) infected over 300 million people all over the world with over 5,700,000 deaths as of February 2022 (WorldHealthOrganization, 2022). This caused a series of lockdown and limited access to dental care and all non-essential services as a measure to control the spread of the virus. The pandemic has caused greater stress and anxiety among parents and caregivers in fear of the virus and has caused higher self-reported dental pain and poor Oral Health Related Quality of Life (OHRQOL) among pre-school children (Samuel et al., 2021).

The impact of the pandemic hit the United Kingdom (UK), forcing the closure of primary dental practices. Pain and infection of dental origin continued to occur leaving many patients and clinicians to face the difficulty of providing emergency dental treatment to avoid progression of dental caries to severe infection (Ilyas et al., 2021).

In the aim to prevent and control dental infections in the middle of the COVID-19 pandemic adjustments in protocols of how dentistry is practiced were applied. In paediatric dentistry, these protocols and guidelines have been developed and approved by the American Academy of Pediatric Dentistry (AAPD) along with the Royal College of Surgeons of England (Maru, 2021). The standard practice recommended in these guidelines is to provide clinical care only to those with medical emergencies or require urgent treatment, while keeping triage at a consultation level. Treatment of medical emergencies is prioritized, and elective Aerosol Generating Procedures (AGPs) were avoided to the best possible extent (Maru, 2021). With the current easing of global restrictions concerning COVID-19, there may be changes to the recommended practices in paediatric dentistry, where the emphasis shall be on prevention and managing non-procedural pain.

#### 1.4.6 [Summary](#)

Non-procedural pain is not clearly defined. After reviewing literature for this study, non-procedural pain is usually described as preoperative, pre-procedural, established pain, or sometimes neuropathic pain depending on the context of study. The definition of non-procedural pain can be derived from the definition of procedural pain. For that, we can define non-procedural pain as “the unpleasant sensory and emotional experience that arises from a health condition or an injury which is not associated with a diagnostic or treatment procedure”.

It has been established from the literature that even though there are different validated tools for different age groups in children to scale and assess non-procedural pain such as the FPS-R, NRS, VAS, Wong-Baker FACES, CAS and FLACC. These tools are not serving its main purpose which is giving better outcomes in pain management practices. Furthermore, there is an increased demand for a solution, especially after the COVID-19 pandemic where no face-to-face appointments were available for months and the oral condition of many children became worse. Dental appointments are now more difficult to secure with the general dental practitioner and a longer waiting periods for those referred to or under the care of a specialist paediatric dentist.

We know that there are different validated pain assessment tools for children, but are they used efficiently by dentists? If so, why are they not helping in steering the clinician to decide on what would be the best non-procedural practice to manage that pain. Are there any other practices in the other healthcare settings that could help dentists manage non-procedural pain in children. These are some of the questions that we will attempt to answer in this project.

#### 1.4.7 Non-procedural pain management

Efforts to improve pain management in children have included approaches to standardize and advance the use of validated pain measurement tools and encourage comprehensive assessment. The discrepancy between improvements in pain assessment practices and pain management outcomes suggests that the way the evidence for pain assessment and evaluation has been translated in clinical practice may have failed (Manworren and Stinson, 2016).

We can state that non-procedural pain management approaches are not standardized, and non-procedural pain management approaches are not individualized. Therefore, further exploration in the effectiveness of non-procedural pain management is important given its current need with delayed appointments and managing pain before the child is expected to have procedural management.

#### 1.4.8 Aims and Objectives

The aim of this study was to evaluate the need for non-procedural pain management and suggest non-procedural pain management practices in paediatric dentistry.

Since the study is qualitative in nature, a modified PICO was used to develop questions. The study PICO is as following:

**Population:** Healthcare workers caring for children under the age of 17 years, and studies including children under the age of 17 with non-procedural pain.

**Interest:** The assessment of non-procedural pain and the adapted pain management practice based on the pain assessment.

**Context:** Healthcare settings treating children below the age of 17 years.

#### 1.4.8.1 *Primary Objective*

- A. Non-procedural Pain Management in Paediatric Patients: A Scoping Review
- B. Conducting a qualitative study to assess the paediatric dentist's view on non-procedural pain assessment and non-procedural pain management.

#### 1.4.8.2 *Secondary Objectives*

Comparing the results to reflect on the effectiveness of the current non-procedural pain management methods.

## **2. Chapter Two: Non-procedural Pain Management in Paediatric Patients: A Scoping Review**

## 2.1 Aims

As reflected on in the literature review, it is concluded that pain assessment tools do not guide clinicians in deciding what would be the best pain management practice based on that assessment. The aim of this scoping review was to scan the current literature and establish how non-procedural pain is managed in paediatric patients in all healthcare settings (dental and non-dental) to have a better idea of what are the different options that can be applicable in the paediatric dental setting, as well as reflecting on previous research and gaps in literature that need more answers by conducting more research. Moreover, this scoping review was intended to map all the current practices in non-procedural pain assessment or non-procedural pain management.

## 2.2 Methods

### 2.2.1 Protocol and registration

The proposed scoping review was conducted in accordance with the JBI methodology for scoping reviews (Peters et al., 2021) and the PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation (Tricco et al., 2018). The final protocol was registered with the Open Science Framework on 06/08/2022 (<https://osf.io/xg6w5>).

### 2.2.2 Keywords

Non-procedural pain, pre-procedural pain, preoperative pain, non-operative pain, pain management, pain assessment, children, paediatric, non-treatment pain.

### 2.2.3 Eligibility Criteria

For this scoping review, the eligibility criteria were based on **Participants**, **Concept**, and **Context** (PCC). **Participants** are healthcare workers caring for children under the age of 17 years, and studies including children under the age of 17 with non-procedural pain. **Concept** is to include studies in non-procedural pain management carried out between 2015 – 2022. **Context** considered all healthcare settings, and

original research articles (any methods) and review articles including systematic reviews, meta-analyses, meta-syntheses, narrative reviews, mixed-methods reviews, qualitative reviews, and rapid reviews.

This scoping review included papers that focussed on the assessment and management of pain before delivering any treatment (medical or dental) in children.

The inclusion criteria were:

- peer- reviewed journal papers that were: published between the period of 2015–2022. “An initial pilot study was conducted for the period between 2005-2022, since pain is a broad topic, and content of non-procedural pain management methods to be mapped, an abstract screening was not sufficient to analyse if a non-procedural method was adopted or not, a full screening of methodology was necessary. Moreover, all healthcare settings were mapped. Given the complexity of the mapping criterion and the narrow timing given for data extraction, focusing on the latest data and the latest pain management practice in the last 7 years will better serve the purposes of this study and the decision”.
- grey literature
- written in English.
- involved human participants.
- Established a novel assessment of non-procedural or non-procedural pain management in children.

The following study types were included:

a. quantitative, qualitative, and mixed-method studies to consider different aspects of assessing/managing pain.

b. descriptive observational study designs including case series, individual case reports and descriptive cross-sectional studies for inclusion.

Text, manuscripts, and opinion papers were considered for inclusion in this scoping review. Papers were excluded if they did not fit into the PCC inclusion criteria of the study.



#### 2.2.4 Search strategy

The search strategy aimed to locate both published and unpublished papers. An initial limited search of MEDLINE was undertaken to identify articles on the topic. The search strategy, including all identified keywords and index terms, was adapted for each included database and/or information source. The reference list of all included sources of evidence was screened for additional studies.

The databases searched included MEDLINE, Cochrane Library, CINAHL, and Web of Science. Sources of unpublished studies/ grey literature searched included (e.g., NHS trust websites, medical/ dental societies, and associations).

#### 2.2.5 Study/Source of Evidence selection

All identified citations were collated and uploaded into EndNote X9.3.3 (Clarivate Analytics, PA, USA) and duplicates removed. Following a pilot test, titles and abstracts were screened by two independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant sources were retrieved in full, and their citation details imported into EndNote X9.3.3 (Clarivate Analytics, PA, USA) under a named subgroup. The full text of selected citations was assessed in detail against the inclusion criteria by two independent reviewers.

#### 2.2.6 Data Extraction

The data extraction tool used was a Microsoft Excel spreadsheet which was modified and revised as necessary during the process of extracting data from each included evidence source.

An initial pilot screening including studies before the year 2015 to establish and analyse different variables and the selected PCC for this scoping review, the spreadsheet used helped in reaching the decision of narrowing the included studies to 2015 to 2022 instead of 2005 -2022 after an intra and inter-examiner agreement between the Chief Investigator (Professor Paul Ashley) and Investigator (Dakila Alkattan). It was established during the initial screening process that excluding studies by only screening the abstracts was not sufficient as the different terminology is used for non-procedural pain and detailed screening of methodology and context was necessary after title screening. Data were extracted from papers

included in the scoping review by two independent reviewers using a data extraction tool developed by the reviewers. The data extracted included specific details about the participants, concept, context, study methods, and key findings relevant to the review question.

The final version of the data extraction tool included different variables (Appendix A). First, the demographics of the included title: the study ID, article title, extracted by (1<sup>st</sup> reviewer and investigator Dakila Alkattan), checked by (2<sup>nd</sup> reviewer and chief investigator Professor Paul Ashley), type of publication (journal article, book chapter, grey literature), year of publication, country in where the study was conducted, authors and affiliations (list as presented on paper), aims and methods. Second, the scoping review PCC variables: population, concept (interventions /programmes implemented), context. Finally, the themes and outcomes of the study: non-procedural pain management practice, results of the implemented pain management practice, and conclusion/recommendations.

## 2.3 Results and Analysis

### 2.3.1 Preliminary identification

Initial database screening resulted in identifying 118 titles based on the used keywords, publication period, and age group. In MEDLINE, the total of 36 titles were identified. Web of Science with total of 53 titles, EBSCO (CINAHL) total of 6 titles, and Cochrane Library with total of 23 titles. Eight further titles were hand selected to include sources of unpublished studies/ grey literature searched included (e.g., NHS trust websites, medical/ dental societies, and associations).

Twenty-eight titles were automatically removed before screening by EndNote X9.3.3 after extracting all initially selected 118 titles from the databases (Figure 2.3.2.1)

### 2.3.2 Screening

The abstracts and methodology of 90 titles were screened to confirm they match the inclusion criteria of being conducted in a healthcare setting, by healthcare workers caring for children under the age of 17 years. These titles should include a sort of non-procedural pain management practice or will be excluded from the review.

A total of 78 records were excluded for not fulfilling the requirements of the review's PCC as mentioned earlier in the methodology. Most of the excluded studies were non-procedural measures to manage post-operative pain, or non-procedural pain that is managed by a procedural intervention which is not part of the PCC of this study. Only 15 titles are eligible for full text assessment and all these titles are included in this review (as shown in fig 2.3.2.1).

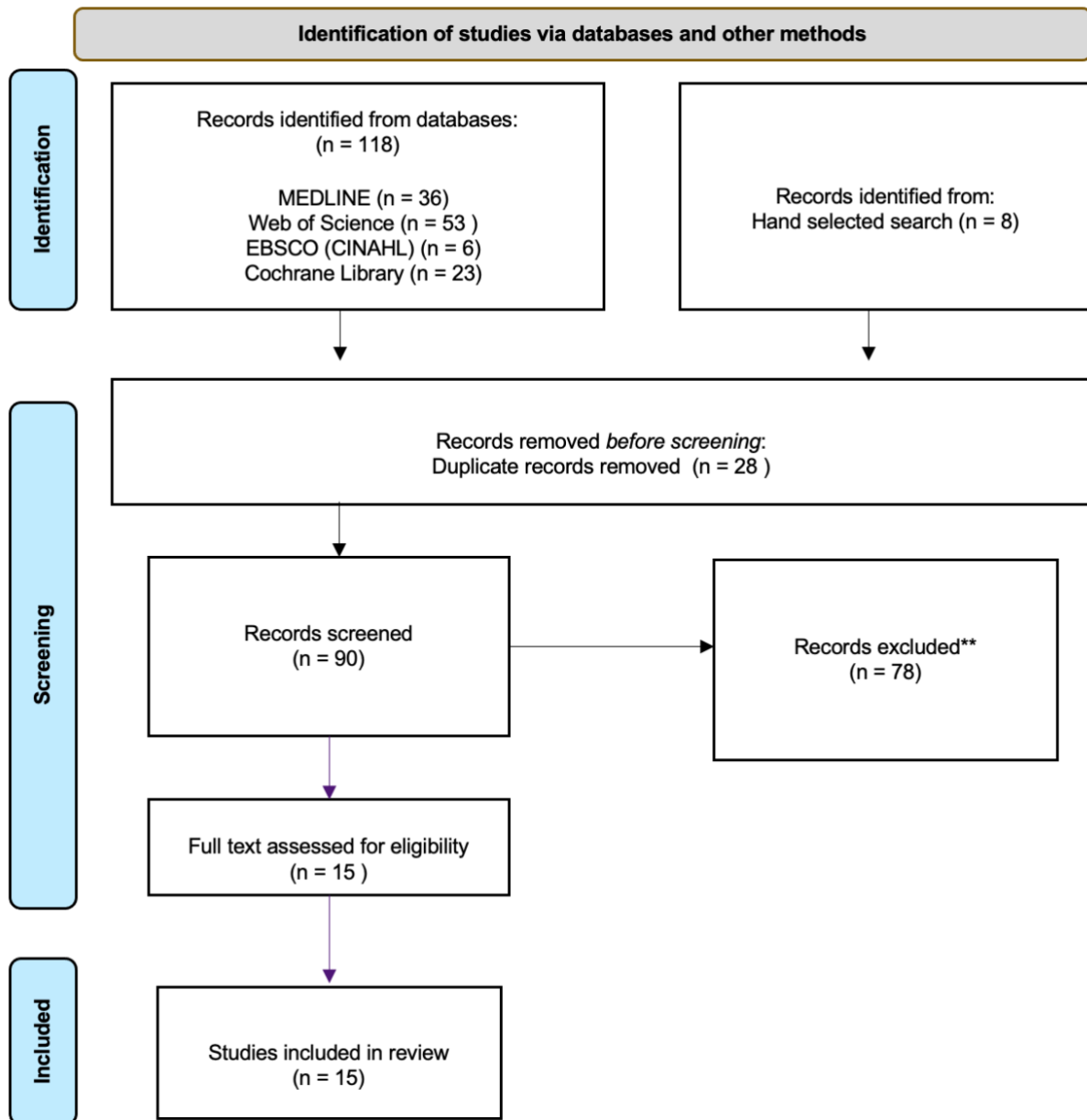


Figure 2.3.2-1 Flow diagram of record screening

### 2.3.3 Reviewed Studies

Five studies were conducted in the UK, 4 studies in Italy, 2 in the US, 2 in India, 1 in Germany, and 1 in Canada. There was variation in the types of the included studies with the following designs seen; reviews, retrospective studies, clinical trials, retrospective observational study, exploratory study, cross sectionals, and pilot studies. All were listed based on the following variables as mentioned in the methodology of data extraction above. First, the demographics of the included title: the study ID, article title, extracted by (name of 1<sup>st</sup> reviewer), checked by (name of second reviewer), type of publication (journal article, book chapter, grey literature), year of publication, country in where the study was conducted, authors and affiliations (list as presented on paper), aims and methods. Second, the scoping review PCC variables: population, concept (interventions /programmes implemented), context. Finally, the themes and outcomes of the study: non-procedural pain management practice, results of the implemented pain management practice, and conclusion/recommendations (Appendix A).

From these 15 titles we then categorised the results into five main themes which will be elaborated in detail. First theme was questionnaires with professionals on current practices in non-procedural pain management. Then, parents' current practices and preferences in pain management. Third, was non-pharmacological management which included: Cognitive Behavioural Therapy (CBT), hypnosis, clowns, musicians, dogs, and soap bubbles. Fourth, was pharmacological management in the form of analgesia. Finally, we looked at current non-procedural pain management policies and guidelines.

#### 2.3.3.1 *Questionnaires with Professionals*

In the United Kingdom, an exploratory qualitative study was carried out (Simons et al., 2020) aiming to identify and critically examine five key elements of pain management as perceived by practitioners.

These were:

Managing pain in a distributed manner with a vision

A stress-free approach to pain management

Confidence in delivery

An individual approach to each child and parent

Raising parents' expectations regarding effective pain management and ensuring their relevance as a framework for the management of children's pain, as well as their potential for implementation in practice.

A qualitative study was conducted using an interpretive, exploratory two-phase design using focus groups (Phase 1) and interviews (Phase 2). Among the 43 practitioners who participated in the study, six band 5 nurses and 11 advanced nurse practitioners were interviewed in focus groups, while 16 pain nurses and 10 consultants were interviewed in semi structured interviews. The elements of this framework served as the basis for the management of pain in children. According to some practitioners, pain management requires more education and resources, as well as a particular culture that may influence the practice of pain management. A framework such as this combines elements that could be utilized as a tool for improving the management of children's pain. The framework is composed of interrelated elements that play an important role in managing the pain of children in a comprehensive manner.

### *2.3.3.2 Parents' Current Practices and Preferences*

Also in the United Kingdom, a cross-sectional study on parents, caregivers, and adolescents who purchase over-the-counter pain medications for children (0-19) or collect pain prescriptions for children (0-19) was carried out (Muirhead et al., 2018). Participants in 1862 pharmacies in London between November 2016 – January 2017 were asked to complete a survey by pharmacy staff and to receive a guidance pack. A survey was conducted with eight questions developed by researchers based on guidance from the National Institute of Health and Care Excellence and the Scottish Dental Clinical Effectiveness Programme. Pharmacists had access to an online survey through their pharmacy computers, laptops, tablets, or smartphones while interacting with parents in real time. In the survey, parents were asked about the causes of their child's pain (i.e., oral pain or another type of pain), whether they had already contacted their regular dentist or another health professional, and whether there were any signs and symptoms of a systemic disease that would require immediate referral to an emergency department. Regardless of the child's pain

complaint, pharmacy staff approached all parents, carers, or adolescents who were purchasing or collecting paediatric pain medication.

Over a period of 10 weeks, parents most commonly sought pain relief for their children from pharmacies due to oral pain. There were two primary outcomes: the number and percentage of parents visiting a community pharmacy to obtain pain medications for children suffering from any pain condition and oral pain, and the number and percentage of parents consulting other health professionals and services prior to visiting the pharmacy. A secondary pain outcome was the type of oral pain (i.e., toothache, newly erupted tooth pain, mouth ulcer pain) and the number and percentage of children who had signs and symptoms of dental emergency: swelling around the throat or eyes, uncontrolled bleeding, trauma to the teeth or jaws, or signs or symptoms of systemic diseases. A majority of parents (65%) went to the pharmacy seeking pain relief for a child who was experiencing oral pain. The proportion of children who visited the pharmacy because of oral pain was only 30%. There was also a difference in the amount of contact with dentists based on the type of oral pain and the age of the child. Approximately 28 percent of children with oral pain had consulted health professionals outside of dentistry prior to consulting a pharmacist. Bringing children under the care of multiple health services when they suffer from oral pain adds a significant amount of cost to the NHS.

### *2.3.3.3 Non-pharmacological management*

A study was undertaken in 2020 at outpatient paediatric psychology and comprehensive sickle cell disease (SCD) clinics in 3 locations at a South-Eastern children's hospital in the United States, to evaluate the effectiveness of cognitive-behavioural therapy (CBT) in treating chronic pain in young patients aged 6-18 with SCD that initiated CBT and those who did not initiate it in a clinical setting. Children with SCD referred for CBT for chronic pain were compared based on therapy attendance: Established Care who attended 3 or more CBT session within 3 months; Early Termination if less than 3 CBT sessions were completed within 3 months; or Comparison with those who did not initiate CBT. Early terminations of CBT were associated with increased rates of admissions and hospital days over time; those

who established care were associated with a quicker reduction in admissions and hospital days over time (Sil et al., 2020).

Another pilot study in Italy evaluated how soap bubbles can be used as a distraction technique to reduce anxiety, fear, and pain among 74 children waiting to undergo a medical examination in the paediatric emergency department. In this two-arm randomized trial conducted in the emergency department of a paediatric hospital, standard care (SC) is compared with soap bubbles (SB) as an intervention to prevent or reduce fear, anxiety, and pain in children prior to and following their medical examination. A significant reduction in perceived pain was observed in the experimental group who were distracted with soap bubbles while awaiting the medical examination, but no difference was found when used after the medical examination (Longobardi et al., 2019).

Also, in Italy at a short-stay observation unit (SSOU), the efficacy of three different nonpharmacologic interventions (clowns, dogs, and musicians) were evaluated in reducing pain, as well as the perception of positive and negative effects. An experimental group (N = 57) composed of patients present in the SSOU, consisting of 105 children (54 boys and 51 girls; aged 3-16 years) was randomly assigned. There were three nonpharmacologic interventions offered to the patients: clowns (18 patients), dogs (24 patients), or musicians (15 patients). The remaining patients were assigned to the control group (CG) (N = 48), consisting of patients who were present in the SSOU without any nonpharmacologic interventions. There were no significant differences between the experimental groups; the 3 interventions all had similar effects on the wellbeing of a child in a different way. For both groups across age and gender, no significant main effect was found regarding pain. Different nonpharmacologic interventions (clowns, dogs, and musicians) seemed to promote positive affect in children but did not affect self-reported pain (Antonelli et al., 2019).

A systematic review done in the United Kingdom included 18 randomised controlled trial including 928 patients between the ages of 6 and 18 years with Recurrent Abdominal Pain (RAP), looked at four types of psychosocial therapies: cognitive behavioural therapy (CBT), hypnosis (including guided imagery), yoga, and self-disclosure through writing. The review concluded that hypnotherapy and cognitive behavioural therapy may be effective in reducing pain in the short term, the evidence

of long-term benefits was limited. Neither therapy was found to have a beneficial effect on quality of life, daily activities, or psychological outcomes such as anxiety and depression. There was no effect of yoga therapy or written self-disclosure as a form of therapy on pain, quality of life, or daily activities. These therapies were not reported to have any adverse effects (Abbott et al., 2017).

A pilot study on 60 participants aged 6 to 17 years of age at the University Hospital Tuebingen, Germany was set up to determine the effectiveness of gut-directed hypnotherapy vs probiotic nutritional supplement (SymbioLact B) on gastrointestinal symptoms in young patients who had functional abdominal pain or irritable bowel syndrome (IBS) in comparison to self-observation alone. For the first two weeks, participants kept only symptom diaries. In a subsequent analysis, this data then served as "baseline" data to compare with any changes that occurred as a result of the intervention. During weeks three and four, participants were instructed to stop keeping diaries. After week four, children were randomly assigned to one of three groups using a computer-generated table of random numbers. The groups were the gut-directed hypnosis group, the probiotic group (SymbioLact B), or the reference group (Nct, 2015a). There were no results provided on this pilot trial.

#### *2.3.3.4 Pharmacological management*

A retrospective brief report on the pain practice in 18 Italian paediatric emergency departments evaluated the prescription and dosage of opioids given to patients 0-14 years of age with acute nonprocedural pain between October 2014 and January 2015. Most opioids were prescribed as codeine plus paracetamol, while morphine was primarily prescribed in large paediatric hospitals. Ibuprofen and paracetamol did not provide the same level of pain relief as prescribed opioids (E Castagno, 2018).

A descriptive and analytical cross-sectional study in India, aimed to assess dentists' attitudes regarding pain management and infection control in treating children and adolescents by evaluating their recommendations of analgesics and antibiotics prior to and after surgical procedures, as well as the use of local anaesthesia (LA) to provide definitive treatment. Over a period of two months, general dentists (GDPs) and specialists were surveyed using a pretested close-ended questionnaire. Approximately 400 dentists were mailed the online link of the present study, out of



which 276 responded, resulting in a 70% response rate. Paracetamol was the most commonly prescribed preoperative analgesic, while amoxicillin was the most commonly prescribed preoperative antibiotic. The majority of GPs and specialists in dental practice who advocate the use of preoperative analgesics and antibiotics recommend the administration of these medications half an hour prior to dental treatment (Kaul et al., 2021).

The American Academy of Paediatric Dentistry has published a literature review on the pain management in infants, children, adolescents, and patients with special needs. The aim of this review was to provide dentists and stakeholders with information regarding current best practices in paediatric pain management. They recommended managing perioperative pain using pre-emptive pain management (e.g., anaesthetics), local anaesthesia during general anaesthesia to control postoperative pain, non-pharmacological anxiolytic interventions (for example, creating a calm environment, providing emotional support), distraction and imagery (for example, counting, playing video games), and pharmacological pain control agents, including non-opioid analgesics (e.g., nonsteroidal anti-inflammatory drugs, acetaminophen) and opioid analgesics. The first line of pain management should consist of acetaminophen and nonsteroidal anti-inflammatory medications. A discussion was provided regarding steps to mitigate opioid misuse among paediatric dental patients (AAPD, 2018).

In Canada, a randomised clinical trial to examine the effectiveness of intranasal fentanyl (INF) as a pain relief method compared to placebo when combined with ibuprofen for children with moderate to severe headaches seeking treatment in a paediatric emergency department. A total of 62 participants aged 8 to 18 years old who presented to the emergency department with headaches as a main chief complaint and with pain measured on the Visual Analog Scale (VAS) of 36 mm or more were recruited. Each participant was assigned to receive INF 1.5 mcg/kg (maximum dose of 100 mcg) or a placebo solution via an atomizer. If ibuprofen had not been administered to either group within the previous four hours, oral ibuprofen 10 mg/kg (maximum dose of 600 mg) was also administered. By providing INF, patients were able to experience relief of their symptoms more rapidly, possibly improve the satisfaction of their families and possibly reduce the length of the

emergency department stay, which will ultimately improve patient quality of care and make it more cost-effective (Nct, 2015b).

An open-label, single-dose pharmacovigilance trial conducted in the United Kingdom, aimed to establish the safety of an intranasal diamorphine (IND) spray in children. The DIAMorphine SAFETY (DIASAFE) study was a multicentre, open-label, single-dose, pharmacovigilance study in 226 children aged 2–16 years with a fracture or other trauma in the emergency department. With the nasal spray, the paediatric tip can be replaced between patients and the product can be used several times. A single dose of diamorphine was administered using two to four actuations of the appropriate product strength directed into the alternate nostril, based on the patient's weight and size. IND has never been approved as a medical product, despite the fact there have been randomised and open-label studies to support its efficacy in children. It is therefore not possible to evaluate the safety of INDs when they are administered to children in a systematic manner. Intranasal diamorphine was administered to 226 children without any serious or severe adverse events (Kendall et al., 2015).

### **2.3.3.5**      *Pain Management Policies and Guidelines*

A retrospective observational study beginning on July 1, 2017, the Piacenza Paediatric Emergency Room (PIPER) in Italy implemented the Pain in Paediatric Emergency Room (PIPER) recommendations for the assessment and management of pain in children. This recommendations and hospital policy mandated that pain is regularly assessed and an algometric scale is used to assess the pain in children. The purpose of this study was to determine whether there was a difference in the trend of outcomes for detecting and treating pain between July-October 2016, 2017, 2018. The discharge letters of 811 extremity traumatized children aged 0-9 years were analysed. There were 12 patients evaluated in 2016 out of 309, 227 out of 243 in 2017 and 245 out of 259. In 2016, four patients were treated during the triage phase, 68 in 2017, and 70 in 2018. It is believed that the introduction of recommendations has resulted in an increase in the frequency of pain algometric measurements during the triage phase, which has led to an improvement in the

nursing care outcomes in terms of paediatric pain management (Granata et al., 2020).

Another narrative review from India on the practicality of tele-dentistry with paediatric patients amid the COVID-19 pandemic. In the effort to devise a sound model of effective, safe, and handy strategies to address dental trauma, endodontic and restorative problems, and orthodontic urgencies until complete clinical help is available. Full texts of 147 articles were eligible for this review. In conclusion, the review proposes a model of tele-dentistry-assisted management of paediatric dental problems during the COVID-19 pandemic which can be enhanced by video-based and live teleconsultation demonstrations in order to reduce the need for dental clinic visits. A teleconsultation mode is available to provide parents and caregivers with at-home recommendations for non-emergency concerns (Goswami et al., 2021).

A clinical guideline developed by the University College London Hospital (UCLH) in London, United Kingdom on the management of acute pain in children and adolescents was also included. The document is to provide guidance on identifying, assessing, treating, and managing acute pain in children and young people up to 19 years of age using a multidisciplinary approach, including both pharmacological and non-pharmacological methods. Children and young people have a wide range of cognitive abilities and chronological ages, requiring an individualised approach to assessment and treatment of pain. Considering the wide range of patients seen at UCLH, these recommendations for treatment are intended to encompass a broad spectrum of conditions. Thus, when treating and assessing acute pain, individual patient factors (for example, allergies, contraindications, co-morbidities) should also be considered (Andrea Leigh, 2020).

The results of the scoping review are summarised below.

*Table 2.3.3.5.1 Summary of the scoping review findings*

<b>Questionnaires with Professionals (UK) (Simons et al., 2020)</b>		
	<b>Non-procedural pain management practice</b>	<b>Findings</b>

	Qualitative research using questionnaires and interviews.	Identified five key elements of pain management as perceived by practitioners and highlighted the need for more education and resources in pain management.
<b>Parents' Current Practices and Preferences (UK) (Muirhead et al., 2018)</b>		
	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Cross-sectional survey of parents purchasing pain medications.	Most parents sought pain relief for their children from pharmacies, primarily due to oral pain, which could lead to multiple healthcare service contacts and increased costs.
<b>Non-Pharmacological Management</b>		
	<b>Non-procedural pain management practice</b>	<b>Findings</b>
<b>Cognitive Behavioral Therapy (US) (Sil et al., 2020)</b>	CBT for children with sickle cell disease.	CBT was associated with reduced hospital admissions over time.
	<b>Non-procedural pain management practice</b>	<b>Findings</b>
<b>Soap Bubbles (Italy) (Longobardi et al., 2019)</b>	Distraction technique using soap bubbles.	Soap bubbles reduced perceived pain before medical examinations.
	<b>Non-procedural pain management practice</b>	<b>Findings</b>
<b>Clowns, Dogs, and Musicians (Italy) (Antonelli et al., 2019)</b>	Nonpharmacologic interventions (clowns, dogs, musicians) in a short-stay observation unit.	All interventions promoted positive affect in children, but none significantly affected self-reported pain.

<b>Hypnotherapy (UK) (Abbott et al., 2017)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Hypnotherapy for children with recurrent abdominal pain.	Hypnotherapy and CBT may reduce pain in the short term but had limited long-term benefits.
<b>Gut-Directed Hypnotherapy vs. Probiotics (Germany) (Nct, 2015a)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Gut-directed hypnotherapy vs. probiotic nutritional supplement.	No specific results provided, but the study explored the effectiveness of these interventions.
<b>Pharmacological Management</b>		
<b>Prescription of Opioids (Italy) (E Castagno, 2018)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Evaluation of prescription and dosage of opioids.	Opioids, particularly codeine plus paracetamol and morphine, were commonly prescribed for acute nonprocedural pain in children.
<b>Dentists' Attitudes (India) (Kaul et al., 2021)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Survey of dentists' attitudes regarding pain management.	Dentists commonly prescribed paracetamol and amoxicillin preoperatively, but practices varied.
<b>Pain Management in Paediatric Dentistry (USA) (AAPD, 2018)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Literature review on pain management in paediatric dentistry.	Recommended various pain management approaches, including pre-emptive pain management, local anaesthesia, distraction techniques, and pharmacological agents.
	<b>Non-procedural pain management practice</b>	<b>Findings</b>

<b>Intranasal Fentanyl (Canada) (Nct, 2015b)</b>	Clinical trial comparing intranasal fentanyl to placebo.	Intranasal fentanyl provided rapid relief for children with moderate to severe headaches.
<b>Intranasal Diamorphine (UK) (Kendall et al., 2015)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Pharmacovigilance trial of intranasal diamorphine.	No serious adverse events were reported with intranasal diamorphine in children.
<b>Pain Management Policies and Guidelines</b>		
<b>PIPER Recommendations (Italy) (Granata et al., 2020)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Implementation of pain management recommendations in a paediatric emergency room.	The introduction of recommendations increased the frequency of pain assessments and improved paediatric pain management.
<b>Tele-Dentistry During COVID-19 (India) (Goswami et al., 2021)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Narrative review of tele-dentistry during the pandemic.	Proposed a model of tele-dentistry-assisted management for paediatric dental problems.
<b>UCLH Clinical Guideline (UK) (Andrea Leigh, 2020)</b>	<b>Non-procedural pain management practice</b>	<b>Findings</b>
	Development of clinical guidelines for acute pain management in children.	Provided guidance on identifying, assessing, and treating acute pain in children using a multidisciplinary approach.

## 2.4 Discussion

### 2.4.1 Quality of Reviewed Studies:

Various study designs were included in this scoping review such as exploratory qualitative studies, cross-sectional studies, clinical trials, systematic reviews, and retrospective observational studies. This range in different designs is valuable as it provides a broader perspective on non-procedural pain management and addresses different research questions. Moreover, the sample sizes vary across the included studies, which is expected with the diversity of research designs and some of these studies may have more broadly representative samples, while others were more specific to certain populations or settings.

Both qualitative and quantitative data collection methods were included in this review, such as surveys, interviews, and systematic reviews. This diversity in study methodologies aligns with the relevant research questions and adds depth to the findings. The studies in this review included various aspects of non-procedural pain assessment and management, which can lead to a comprehensive understanding. It can be established from this review that the topic of non-procedural pain assessment and management is scarce and lack consistency and suggest further research needed.

### 2.4.2 Implication to Paediatric Dentistry:

It is important to reflect on how these studies can be reflected to the clinical practice in paediatric dentistry. Despite being conducted in healthcare settings and for varying conditions their findings can still be utilised to enhance non-procedural pain management practices in paediatric dentistry as outlined below:

#### **Questionnaires with Professionals:**

The study conducted in the UK, which aimed to identify key elements of non-procedural pain management as perceived by practitioners, highlights the importance of a comprehensive approach to non-procedural pain management. In paediatric dentistry, this could translate to ensuring that dental professionals are well-trained in assessing and managing non-procedural pain, with a focus on

individualised care for each child and parent, in which we will focus on in the next chapter of this project by reflecting on the perception of paediatric dentists on what are the elements, importance, and implications of non-procedural pain management.

### **Parents' Current Practices and Preferences:**

The cross-sectional study in the UK provides insights into the reasons parents seek pain relief for their children, with a focus on oral pain. Paediatric dentists can use this information to tailor their communication with parents and caregivers, providing guidance on when to seek dental care for oral pain and emphasizing the importance of early intervention to avoid multiple healthcare visits.

### **Non-pharmacological Management:**

The studies on non-pharmacological pain management techniques such as cognitive-behavioural therapy (CBT), soap bubbles, clowns, dogs, and musicians offer a range of options that can be adapted in a dental setting. Paediatric dentists can explore distraction techniques, like using music or providing a calming environment, to reduce anxiety and pain in young patients. However, this is probably not of much use for non-procedural pain. CBT is an intervention that may help children at home with dental pain and is something that could be potentially integrated into treatment plans to help children manage.

### **Pharmacological Management:**

The reviewed studies on pharmacological non-procedural pain management, discussing the use of opioids, ibuprofen, and other analgesics, had reflected on the appropriate use of pain medications in paediatric patients. It is recommended that paediatric dentists are aware of current guidelines and best practices in pain management, including dosages and types of analgesics recommendations for different age groups. It is necessary to prioritise non-opioid analgesics whenever possible to mitigate the risk of opioid misuse.

### **Pain Management Policies and Guidelines:**

The studies which reflected on pain management policies and guidelines, highlighted the importance of regular non-procedural pain assessment and having a



standardised tool. Paediatric dental settings can benefit from implementing similar guidelines that highlight non-procedural pain assessment as an integral part of care. This can improve the overall quality of paediatric dental care and ensure that the subsequent pain management (procedural or non-procedural) is tailored to the child's needs. We did not identify any consistent themes or guidelines, this is probably due to the availability of different validated assessment tools for different age groups as mentioned in chapter 1, yet these assessment tools did not drive the current practice to a more standardised or individualised pathway of non-procedural pain management.

## 2.5 Summary

A wide range of non-procedural pain management strategies can be applied in paediatric dentistry based on the mapped studies presented in this review. The integration of these findings into paediatric dentists' practices enhances the quality of care they provide to young patients, minimises pain and anxiety and promotes overall oral health.

Simons, et al (2020) proposed that non-procedural pain management should take a comprehensive approach in order to identify key elements. It would be sensible to dedicate a chapter in this project in reflecting on how the paediatric dentist could ensure that they are well-trained in assessing and managing non-procedural pain, with a focus on individualised care for each child and parent. Therefore, in the next chapter of this project we will focus on reflecting on the perception of the paediatric dentist on what are the elements, importance, and implications of non-procedural pain management in children.

# **3. Chapter Three: Assessment of Paediatric Dentists Views on Non-procedural Pain Assessment and Non-Procedural Pain Management: A Qualitative Study.**

## 3.1 Aims

Non-procedural pain can be defined as “the unpleasant sensory and emotional experience that arises from a health condition or an injury which is not associated with a diagnostic or treatment procedure”. There different tools to record and assess non-procedural pain were described in chapter 1, however these are not designed specifically for paediatric dentistry and do not support delivery of better outcomes in non-procedural pain management practices. In chapter 2, it was established from the scoping review which covered the literature between 2015 to 2022 that no new assessment tools were proposed, and a few non-procedural pain management interventions proposed. Furthermore, nonprocedural pain management protocols are not standardized or individualized in paediatric dentistry. The aim of this study is to understand the views of paediatric dentists on non-procedural pain assessment and management.

## 3.2 Methods

### 3.2.1 Ethics

This project was approved by the UCL Research Ethics Committee (Appendix B) with the Project Ethics Identification Number (23859/001). Health Research Authority (HRA) approval was not required as this study do not need the National Health Service Research Ethics Committee (NHS REC) approval as per HRA-decision tool.

### 3.2.2 Study design and participants

A qualitative study was conducted in 2023. The participants of this part of the study included: paediatric dentists in the department (consultants, specialists, registrars, speciality trainees). The exclusion criterion are dentists with less than a year of previous experience in delivering dental care to paediatric patients.

Clinicians in the paediatric dentistry clinic at the Royal National ENT and Eastman Dental Hospitals were recruited by sending the Participant Information Forms (PIF) to their NHS emails (Appendix C, Appendix D) explaining the study and upon agreement to participate in the study to reply to the email of the researcher to

arrange consent and further explanation of the study in person. If the clinician had any questions the student researcher was available to answer any queries they may have in person or via email.

Clinicians who agreed to participate received a copy of the consent (Appendix E) and PIF via email and a hard copy to sign. Participants chose a preferred slot with the researcher for an online interview through a UCL approved online platform (zoom.com). There were 20 paediatric dentists in the Royal National ENT and Eastman Dental Hospitals at the time of recruiting participants who all received the recruiting email and response rate was 17 participants who were all consented for this study, then 14 participants only were interviewed after reaching a saturation level. All questions raised by the participants were addressed by the student researcher who was available to answer any queries they had before consenting for the study.

### 3.2.3 Data collection

This study was conducted as a semi-structured guided online interview with open-ended answers conducted individually with all the participants.

The semi-structured guided online interviews with open-ended answers were conducted individually in an online platform (zoom.com) by a researcher who is a postgraduate student in the DDent in Paediatric Dentistry programme (UCL) at the time of the study. They received suitable training from the Social Research Association (SRA) training in: Introduction to Qualitative Research (NatCen). Training involved 8 hours of theory classes. The interviewer was able to recognise the participant as they work in the same paediatric department, yet no identifying information was included in the recordings or transcripts. Before the interview, the interviewer engaged in an initial dialogue with participants to determine whether they were willing to share their individual experiences and create a favourable environment in which they felt at ease.

The questions were adapted based on the objectives of this study. The interviews were guided by a topic guide (Table 3.2.3.1) and participants were approached individually to explain the aims, objectives, and method of research. When joining the meeting and before recording started, a non-identifying ID code was set for the

meeting. The interviewer outlined the aims and objectives of the study, explained that the interview will be recorded, confirmed the participant's verbal permission, and reminded the participant of the length of the interview. After recording started, the interview included 4 themes from which questions were asked around. These themes as per the topic guide were:

- Dentist's perception of the need and the importance of a baseline pain assessment prior dental treatment.
- Challenges in obtaining an appropriate non-procedural pain assessment.
- Challenges in decision making of non-procedural pain management practice.
- Perception on how well parents/carers are managing pain at home.

Table 3.2.3.1 Interview Topic Guide

Topics	Interview questions/ Prompts
<b>Introduction</b>	
<b>Introduction</b>	<p><b>Aim:</b> <i>To introduce the interview</i></p> <p>Introduce interviewer.</p> <p>Outline the aims and objectives of the research.</p> <p>Explain what data will be used for and how it will be treated.</p> <p>Explain the interview will be recorded, with the participant's permission, for an accurate record of what is said.</p> <p>Remind participant of length of interview (20-30min)</p>
<b>Begin recording</b>	<b>Ask for permission to record and begin recording.</b>
<b>Background information</b>	
<b>Contextual information</b>	<p><b>Aim:</b> <i>to allow participants to introduce themselves and to gather contextual information.</i></p> <p>No name will be asked.</p> <p>Background dental experience</p> <ul style="list-style-type: none"> <li>○ Number of years as a qualified dentist</li> <li>○ Number of years working with children for dental treatment</li> <li>○ Experience with phone appointments</li> </ul> <p>Intervention attended</p>
<b>Implementation</b>	

<p><b>Dentist's perception on the need and the importance of a baseline pain assessment prior dental treatment</b></p>	<p><i><b>Aim:</b> to understand how pain assessments tools are used by paediatric dentists and their perception on how it guides with pain management decision.</i></p> <ol style="list-style-type: none"> <li>1. What do you think about the different types of pain assessment tools used with children?</li> </ol> <p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• Like them? Don't like them? Importance? Why?</li> <li>• Do you use them in phone appointments?</li> <li>• Do you use them in face-to-face visits?</li> </ul> <ol style="list-style-type: none"> <li>2. Would you prefer asking the child or the parent when assessing pain? Why?</li> <li>3. If the child can't express pain (due to age or disability) do you think the parent/carer can accurately reflect on the extent of pain accurately?</li> <li>4. Do pain assessment tools guide you in the type of non-procedural pain management? How?</li> </ol> <p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• Preferred guidelines or pathways</li> </ul>
<p><b>Challenges in obtaining an appropriate non-procedural pain assessment</b></p>	<p><i><b>Aim:</b> to understand the difficulties paediatric dentists face when assessing non-procedural pain</i></p> <ol style="list-style-type: none"> <li>1. What are the challenges in assessing non-procedural pain in children?</li> </ol> <p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• What have you liked?</li> <li>• What didn't you like?</li> </ul> <ol style="list-style-type: none"> <li>2. How different is using pain assessment tools on a phone appointment from face-to-face appointments?</li> <li>3. Will inaccurate assessment of pain result in an unsuitable non-procedural pain management?</li> </ol>

	<p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• Types of non-procedural instructions</li> <li>• Instructions on pain medication</li> </ul>
<p><b>Challenges in decision making of non-procedural pain management practice</b></p>	<p><b><i>Aim:</i></b> <i>to understand the challenges paediatric dentists face to practice non-procedural pain management.</i></p> <ol style="list-style-type: none"> <li>1. What are your views on the efficacy of non-procedural pain management?</li> </ol> <p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• What you like?</li> <li>• What don't you like?</li> <li>• Can they help before receiving dental treatment?</li> </ul> <ol style="list-style-type: none"> <li>2. What are the challenges that you face when giving non-procedural pain management instructions to parents/carers?</li> </ol>
<p><b>Perception on how well parents/carers are managing pain at home</b></p>	<p><b><i>Aim:</i></b> <i>to understand the views of paediatric dentist in how well parents/carers are managing pain</i></p> <ol style="list-style-type: none"> <li>1. What are your views on the adherence of parent/carer to the given non-procedural pain management instructions?</li> </ol> <p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• Signs of adherence</li> <li>• Face-to face vs phone visits.</li> </ul> <ol style="list-style-type: none"> <li>2. Do you think parents are already aware on how to deal with pain at home before speaking/seeing a paediatric dentist?</li> </ol> <p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• Types of pain management parents deliver.</li> </ul>



	<p>3. Do you think paediatric dentists should follow up with parents/carers on the effectiveness of non-procedural pain? Why? How?</p> <p>4. In your opinion, do you think better pain management outcomes at home should affect the prioritisation of when the patient is seen?</p> <p><i>Prompt if needed:</i></p> <ul style="list-style-type: none"> <li>• If still in pain, patient to be seen sooner.</li> <li>• If not, to be seen later?</li> <li>• How to follow up?</li> </ul>
<b>Close</b>	
<p><b>End recording</b></p> <p>Once participants have raised final points, the recording should be stopped.</p>	<p><b>Turn recording off</b></p>
<p><b>Close</b></p>	<p><b>1. Close</b></p> <p><i><b>Aim:</b> to give the participant the opportunity to ask questions about the interview and to provide the interviewer's contact details.</i></p> <p>Thank participant for taking part.</p> <p>Reiterate information on:</p> <ul style="list-style-type: none"> <li>○ Aims of data collection</li> <li>○ Data protection</li> <li>○ Confidentiality and anonymity</li> </ul> <p>Provide contact details.</p>

At the end of the interview, the recording was closed and then the participants were thanked for taking part. A recap was delivered on the aims of the study, data protection, confidentiality and anonymity, and the contact details of the researcher. The interviews were recorded and transcribed for subsequent qualitative content

analysis. Recordings were encrypted and saved in the licenced UCL zoom server, and auto transcribed. The transcript was saved with same ID code of the recording with no identifying details of the participant and saved in a UCL approved server storage.

Interviews were analysed before the completion of the data collection process to enable the determination of repetition in the comments, indicating if saturation had been reached (Green, 2004). The transcripts were not returned to participants for comments or corrections.

### 3.2.4 Data analysis

The information obtained in this study was interpreted using a thematic-based approach (Braun, 2006). The analysis of the discourses was performed separately by the investigator and one of the chief investigators (PA), and organized in three steps: pre-analysis, data analysis, and interpretation of the findings. Pre-analysis involved the organization of the material to systematize the ideas. The discourses were transcribed verbatim, maintaining grammatical errors and linguistic terms related to the local culture to maintain the emphasis and identity of each interview. Based on the content of the interviews, additional categories were included to better represent each group. To ensure the internal consistency of the data, the analysis was performed individually by the authors of this study. The results are therefore described based on the set of categories, and triangulation from the information among the groups.

## 3.3 Results

The initial sample size of 17 clinicians were consented for the study and interviews were analysed before the completion of the data collection process and saturation had been reached after interviewing 14 clinicians. As per the themes from the topic guide, all the 14 participants were asked questions that addressed the following themes: the dentist's perception of the need and the importance of a baseline pain assessment prior dental treatment, challenges in obtaining an appropriate non-procedural pain assessment, challenges in decision making of non-procedural pain

management practice, and perception on how well parents/carers are managing pain at home. Participants demographics are referred to below by their interview codes, years of experience, and gender)

### 3.3.1 The dentist's perception of the need and the importance of a baseline pain assessment prior dental treatment.

Participants were asked about their perception of how significant it is to have a baseline pain assessment using a tool or a guideline prior to planning for treatment and the delivery of treatment. Responses were divided into 2 main groups:

1. Paediatric dentists who don't use any type of assessment tool and depend on the pain history.
2. Paediatric dentists who mostly use the Numeric Pain Rating Scale (NRS) along with the pain history.

Responses from the clinicians who did not use any type of assessment were as follows:

"In terms of an actual tool to see how the child is, no, I don't have a set tool. So, it's just asking the child or the parent, what kind of pain they're having. And just to explain it, basically. It's a discursive situation, really, rather than a set of tools". (P003, 33, F)

"I don't find that I use formal pain assessment tools very much in my clinical practice. I know that they exist, but they're quite imprecise, you know, sort of like faces scales, or you know, 0 to 10, and that kind of thing. So, I think it can be quite imprecise. If you're asking a child to choose a number or choose a face". (P007, 22, F)

"I rarely use them. I just think with children it's a bit hard to put the number on the pain. They wouldn't really be able to express it as much". (P014, 5, F)

"I try and assess pain perception in children who have had previous dental experience, whereas for those who have never had a dental treatment done, I do think it might not work best, because they don't really know what dental pain might

be like, and if anything, it might scare them in anticipation of dental pain”. (P013, 4, F)

“Some of the responses from the clinicians who used the NRS tool were as follows:

“I would give a patient to scale from 1 to 10, ten being the most painful, and zero being no pain at all, and that gives me an indication if the patient is experiencing excessive pain. After that, obviously, we would need to do an assessment other than the scale from one to 10. I personally do not use any other scales. I mainly do face to face visits, but if I had the opportunity to do a telephone appointment or a virtual session, I would ask that question as well”. (P001, 6, F)

“Usually, we just say like one to 10, usually. That's what I would use”. (P006, 8, F)

“There is a scale that we can sometimes use where the child, for example, first tells us that they are in pain or not, and they can score it from 0 to 10, for example, telling them like 0 is no pain. 10 is a lot of pain. If it is causing any trouble while eating, or if it's causing in trouble at night that wakes them up” (P002, 3, F)

#### *Asking the child or parent*

Participants were then asked if they prefer to ask the child or the parent when assessing pain. Most of the answers responded as preferring to ask the child if age appropriate as they are the ones experiencing the pain. Some variations in views were mentioned:

“Usually, I ask the parents. Some questions are better answered by the parents like, if the child is in pain when eating, or any disturbance with the sleeping of the child. But in case of that specific pain, I mean all specific area in the mouth, or anywhere else in the body, I mean in this situation I prefer to ask the patient”. (P002, 3, F)

“I think that both has value. If the child is older, then I think the child is probably more reliable because they know how it feels”. (P011, 25, F)

“Because The threshold of pain of the parent might be different than the child. The parent might have been through a lot. and they might perceive the child's pain as maybe less than what the child would perceive it to be”. (P013, 4, F)

“It's tricky, isn't it? Because some children are shy, or they won't necessarily speak up. So you know that actually, at those times it's helpful when the parents tell you about the pain. Sometimes it's the other way around when that parents are just really frustrated, or parents just want to get treatment. So they know to say that my child is in pain”. (P010, 11, F)

“I would ask that child and gain other information from the parents as well”. (P009, 9, M)

“It's harder on a telephone because the child might not be on the call. But in a face-to-face situation, I would ask both. But in an older child, I may ask them first. Were you kept awake? How? How was your pain? But on a telephone. It would probably be the parent that is answering exclusively those questions”. (P003, 33, F)

#### *Can children express pain?*

Clinicians were asked if they thought that for children who can't express pain due to age or disability, would the parent be able to accurately reflect on the pain? And different views arise:

“They can't quantify it. They can't put it in a scale from one to 10, but they will be able to give us information that is gonna still be reflective of how the pain is actually bothering the patient”. (P001, 6, F)

“Sometimes they might, so they might over exaggerate it, or they might express that it's worse than that actually is, just because they're looking out for their child, and they want some treatment done”. (P002, 3, F)

“Definitely indicators of pain with children, such as being kept awake. Perhaps with the special needs child changes in behaviour. Any child whether they're eating okay or not. whether they're concentrating well at school or not. whether they're crying for no particular reason. That's seems very related to the last few weeks, or something that might point to a dental issue those sorts of things”. (P003, 33, F)

“It's as accurate as it's going to be given that they're expressing someone else's experience”. (P005, 26, F)

“I don't think they can accurately know but they may have seen previous experience of pain and know the signs and what to look for”. (P013, 4, F)

### *Pain assessment guides?*

Clinicians were asked at the end of this section if any type of pain assessment might guide them in the type of non-procedural pain management. Responses varied as most participants did not use any tool other than the Numeric Pain Rating Scale NRS, therefore the non-procedural pain management was more based on the clinician's observation of the child's behaviour towards the pain with a thorough pain history:

“My behaviour towards the child is more led by what I can see on the face of the child if that makes sense, I don't need an assessment tool to know if the appointment is going nicely or not”. (P008, 10, M)

“It would be helpful if they were designed in a different way”. (P012, 8, F)

“These scales are present for us to kind of have a rough idea of what the pain is. It's there to give us a kind of a subjective value, they won't be able to tell us what to do with that pain. It comes from a clinical judgment after being able to clinically evaluate the patient followed by having some X-rays to be able to determine what sort of management we would proceed with”. (P001, 6, F)

“They do give me a good idea if there is anything that we need to prescribe or is there anything we need to do when the child comes in or is it something that we have been managing for months now and it is just occasional pain”. (P002, 3, F)

### 3.3.2 Challenges in obtaining an appropriate non-procedural pain assessment.

Most participants emphasised when asked about the main challenge in obtaining an appropriate pain assessment from a child as a paediatric dentist was young age, disabilities, and language barriers. In addition to some challenges that was faced by some of clinicians:

“Some patients may have a high pain threshold, meaning that an individual might have excruciated pain, but because the patient has a high pain threshold, they're not actually reflecting to what extent they are experiencing it. Sometimes patients avoid saying what they really truly feel. So, for example, they would say, I'm not in pain, that could be due to their anxiety or phobia from getting any dental statement. sometimes there might be a little bit of inconsistency in terms of pain history provided by parents and their children. So that is an issue”. (P001, 6, F)

“Sometimes a lot of children don't say how they're feeling in front of other people, although they do understand that we are here to help you as dentists and want to know what is going on. So I think it's just communication is sometimes the hardest when you see a child, because it all revolves around communication”. (P002, 3, F)

“I am a firm believer that as far as the children don't have an opinion about pain, particularly. Perhaps an older child or a teenager might. But generally, they will, demonstrate what they are feeling. I sort of feel that nobody is tolerant of pain, and that it's not correct to say that one child can cope with more pain than another child. That's exactly the same age and with the same dental problem. I think one needs to respond to the fact that the child is in pain. Full stop and not think well, they can put up with a bit more than then the next child”. (P003, 33, F)

“The fact that everybody has a different threshold for pain. someone's moderate pain may be very severe to them, whereas the next person may. you know, classify that as a moderate pain. So, it's quite subjective. Parents obviously want treatment to their child quite quickly. So, one of maybe the most simple ways is to overestimate the level of pain because they think that's going to get their child treated more quickly”. (P005, 25, F)

“I think pain can fluctuate. So sometimes when a patient comes and presents to you, they're not feeling pain at that time. I think children can sometimes not say that things are hurting because they're worried that you're going to do treatment for them, I think parents will sometimes play up pain because they think that's going to make them get treatment sooner. So, I think there's some different things which can distort what patients report to you. on the other hand, sometimes patients are really good at describing pain, and can explain to exactly what it is and what it feels like, and which

tooth it's coming from. So, I think it's something that can vary very much from patient to patient". (P007, 22, F)

"It could be because we work with the oral cavity, you might the muscles of the face may be painful around the jaws, you might have referred pain, so it makes things tricky". (P013, 4, F)

### *Differences between virtual and face-to-face appointments*

Participants were then asked if there are any difference when assessing pain on the phone or face-to-face, as all 14 participants have experience with telephone clinics, the main point of view that was emphasised is that phone clinics are mostly done with the parent and the pain is assessed mostly without the child present.

One clinician elaborated: "The biggest thing is probably that the child is not in front of you, so you can't pick up other visual clues. So I think one can pick up visual clues about how a child may be feeling. You can also, with a clinical exam you can look at, for instance, how they clean their teeth, or whether they're avoiding parts of their mouth and all the rest of it. On the telephone, you know you can only be guided by what the parent tells you and parents may respond to their child's pain in in many different ways". (P003, 33, F)

Another clinician's perspective found no difference: "It's the same thing basically. Most important things that I ask about is the eating habits and the sleeping habits. If these are affected by the pain or not. This is how I usual assess how severe the pain is. Of course, in the face-to-face clinic we will be able to gather more details on the point of examination, but in terms of assessing pain itself, I don't think there is a difference".(P008, 10, M)

This was also similar to another response where clinical examination is the only difference: "Not that much different in assessing pain, the only difference can be in the clinical findings with examination". (P004, 7, M)

Another clinician commented: "So if they're on the phone and the child's there, I suppose that can be helpful, because obviously a lot of the time you are on the phone. and the parent can't remember exactly which tooth it is, or they have lots of



children, or remind me which tooth is it? Which side? Or let me have a look? If the child's not there, then obviously they can't do that. It's tricky, because there are some benefits, because sometimes when you have phone appointments and talk to the parents on the phone, they might have a little bit more time to discuss with you with a child not being there, but obviously the fact that the child isn't there means that they don't get to express how they're feeling, and they're the ones that are actually experiencing it". (P010, 11, F)

### *Assessment of pain*

When participants were asked if an inaccurate assessment of pain resulted in an unsuitable non-procedural pain management, further probing was necessary to clarify what was meant by non-procedural management of pain which included instructions given to the parents on the phone or face-to -face, behaviour management, and pharmacological instructions of pain relief. Views were divided into inaccurate assessment affecting a suitable non-procedural management, and inaccurate assessment not affecting the type of non-procedural management.

#### *Inaccurate assessment affecting a suitable non-procedural management:*

"Definitely Yeah, we might let them go home without giving any pain instruction if they only say there is a slight discomfort instead of an actual pain". (P002, 3, F)

"Yeah. So if in case if the pain was affecting the eating or sleeping of the patient then we will prioritise that tooth needing important treatment to begin with" (P004, 7, M)

"I think that it's essential for the planning, because there are certain techniques that we adopt, that we rely on when we know something is being painful or not. Also, there is another aspect in terms of safeguarding and being on board with things. If a child is having pain that's impacting their wellbeing and, for example, missed appointments, or they don't have treatment, then that has a consequence. And often, you know, you might be asked to share. Did this child have pain or problems?". (P011, 25, F)

"I think I would prioritize them for the treatment or for the management. But if I'm feeling that the tooth is not having pain or very mild pain, I would give, like some

recommendations, maybe to visit the local dentist, take some medications, painkillers. Then I wouldn't prioritise them for the treatment". (P012, 8, F)

"I believe yes. Because if I have a child patient that has severe pain, they're not able to sleep, they're not able to eat, then I might want to do something about it and booked them at the next possible appointment. But if they say that the pain is occasional, or it's just sensitivity, then we might just want to recommend some medication or sensitive toothpaste and monitor". (P014, 5, F)

*Inaccurate assessment not affecting the type of non-procedural management:*

"It's important to make sure the pain history is correct to be able to give them an accurate instruction or what kind of further treatment they need. Using pain assessment for example, any scale, and then if the pain history does not follow through with the pain assessment. I would want to do further investigations to exactly identify why they do not match before actually giving any instructions or recommendations for pain medication". (P001, 6, F)

"I think you put that in the context of the rest of the clinical picture. So it depends what the diagnosis is. For example, if it's something like MIH (Molar Incisor Hypomineralisation), when you suspect, it's MIH, no level of pain that's going to take you down one treatment pathway, for example, dressing the teeth. If someone's presenting with caries with what seems to be an acute pulpitis. Pain history is going to take you down another pathway, which you know we hope you to get the child in quite quickly, maybe to take the tooth out or treat it, or an existing infection. But in the context of the clinical features, not just on the pain or history alone". (P005, 26, F)

"No, because I don't usually do something specific for the pain, it's more like for the infection in terms of managing. Probably it's only beneficial to how quickly I would see the patient" (P008, 10, F)

"We always think, especially again for the patients we don't see we think it must be the caries, but often it's you know, food packing, that's the issue. If you could see the child, then you can ask certain questions or ask parents further questions based on the clinical feature. Food packing, for example, they don't necessarily need

painkillers for that. They just need stabilising, so the food does not get packed. The painkiller is not really going to help, similar thing with eruption of teeth. But it's a totally different case when it's a reversible or irreversible pulpitis". (P007, 22, F)

### 3.3.3 Challenges in decision making of non-procedural pain management practice.

In this part of the interview, the participants answered two questions, (i) if they find non-procedural pain management effective and (ii) what are the challenges when managing pain without a procedure?

#### *Efficacy of non-procedural pain management:*

Views varied significantly in this part of the interview on how much non-procedural pain actually helps the patients and paediatric dentists:

"When a patient is in pain, I do prefer to see them as soon as possible and provide a procedure to eliminate the pain. But that's because we're almost always trained to do some sort of intervention to eliminate the pain. So having a non-procedural management, that's definitely a good way to help patients. So, for example, if a patient is planned to have treatment under general anaesthetic and is unable to actually sit through any sort of treatment, and the pain is bearable and not actually affecting them in ways where they have swellings or sinuses and not life threatening for them to have an emergency treatment, then it does play a big role in terms of allowing those patients to wait a bit further, but still would hopefully manage their pain" (P001, 6, F)

"Maybe it helps to reduce the pain for a short period, but because the pain is related to a dental disease. It has to be treated to avoid further flareup and exacerbation of the pain". (P004, 7, M)

"I think they're really poor. I don't think we manage pain very well at all. when you think about it, we get patients very upset when they're in pain. I think MIH in a way, is a bit easier to deal with, because we can ask the dentist to do something simple, like putting a temporary dressing on the affected tooth, or using tooth mousse or something to get some temporary relief until we can see them. I think the caries pain

is much more difficult in a young child to get the chance to advise with anything. Advising them to take over the counter painkillers which often the patients and the parents are already doing that. So I'm not sure that we sometimes add an awful lot to when they present to us an acute pain. And maybe we need to look at the system of how we then get those patients in and manage that". (P005, 26, F)

"Sometimes it can help. Usually I tend to, even over the phone, give advice on exercises that they can do using hot and cold therapies. Hot water bottle, ice pack stretching, relaxing. I might recommend often, because like teenagers who are quite anxious and stressed, and grinding. I might also recommend for them to try some mindfulness apps, or starting some yoga, or like that kind of thing. I'm also a big believer in pharmacological management of pain". (P007, 22, F)

"They definitely help, this is the reason children usually gets referred to the paediatric dentist as the general dentist don't have are not trained for this kind of management in their skill set. Because they can't manage children without a procedure" (P008, 10, M)

"It is effective when the communication is better before the appointment with the child in pain. We can describe over the phone like over the counter medicines that they can take if they are in pain, and before they are coming to see the dentist. It is important to reduce the base pain before coming to the appointment, because it will help with the cooperation". (P009, 9, M)

"Yes, you kind of have to use analgesics and all of those other things as well, I suppose to support the child in pain until they can have the definitive treatment done". (P010, 11, F)

"More likely on the longer-term kind of on-boardness, and less likely to create a frightened patient if you're doing all of those basic things really well, I think these types of management have a massive role as well". (P011, 25, F)

*Challenges when giving non-procedural pain management instructions to parents or carers:*

“Parents wanting more, meaning that when they are having something that is not actually a treatment, they might feel like we are not doing enough”. (P001, 6, F)

“You want them to listen well while you're explaining, because sometimes it's a lot of things that you want to go through or explain, and need the parents to grasp all the information in order to do that home” (P002, 3, F)

“Parents may feel that they've already, you know, done all those things, and that they just want to get treatment as fast as possible. And in today's situation of waiting lists and access to care. I think that's perfectly justified. Some parents may find it difficult to listen to a health professional because they're worried about an assessment appointment, whether it be on telephone or face to face, they might find the whole situation of talking to a health professional, quite intimidating. And that can be a barrier to them, really listening to what you're trying to say and so that you know that can be an issue. There may be other physical barriers like language barriers and things where you're trying to explain things, and you might not have adequate interpreting services available to go through things”. (P003, 33, F)

“Using appropriate language, not using jargons and making sure you're thinking about any language barriers for the parent and the child and using techniques to give advice and checking back if they understood what you said. If you've got a parent who's had a child who's in a lot of pain, and they've been up all night, and they're tired, and they've got other children, then it's all very difficult. They're not necessarily to keep receptive to listening and can miss a lot of information. So actually, when don't necessarily have written information to share with them at that point. That's maybe something we want to think about. I guess with the children, again you are looking at their cognitive ability where they've got any sort of learning or additional needs. The cultural beliefs about pain management can also be a barrier, because some people might have their own cultural ways of managing pain that don't necessarily fit a Western method of a pain management”. (P005, 26, F)

“I think we never really know how much people are taking in and how much they're going to listen to us. Often parents think that child need antibiotics rather than just non-procedural pain management, that antibiotics is going to be this magic thing which is going to make the pain go away. If you do have like an infected tooth, or

and the pain' has been going on for a long time is actually a very horrible situation for a child and their family to be having very long-standing dental pain. Sometimes, they do need definitive treatment to solve the problem, and you know some paracetamol will not going to be enough at this point". (P007, 22, F)

"If you give parents a full set of instructions, including taking painkillers, probably they would only follow the type of medication because it is the most straightforward thing for them than any adjustments in lifestyle". (P008,10, M)

"Sadly, a lot of people say they can't afford the pain medication. They may not tell you that, but probably you know that, but some people do openly tell you. I think with a lot of parents it may be that they can't afford pain relief and we can't give it as a prescription". (P010, 11, F)

#### 3.3.4 Perception on how well parents/carers are managing pain at home.

For the last part of the interview participants were asked four questions to understand the views of paediatric dentist regarding how well parents or carers are managing their child's pain.

##### *Adherence of parent/carer to the given non-procedural pain management instructions:*

Comments varied on the sign of adherence and varied with face-to-face versus telephone visits with some repetition in responses. To amplify on the main points raised by the clinicians:

"One thing that I can think of is parents who were not listening carefully, or the instructions were just given verbally and not written and then they might forget some of the instructions. if you're doing a telephone appointment, I would recommend emailing the instructions whenever possible and written instructions if it's face to face which is not the current practise" (P004, 7, M)

"I feel like sometimes, maybe, if the patient is a young child, they do take better care than when they are a bit older. They might think that the child has the ability to take care of, for example, improving their oral hygiene, brushing a bit better. Moreover, on

the phone clinics you would recommend and advise on what parents should do, but in face-to-face appointments you can actually show them”.(P002, 3, F)

“One of the things you can do is to safety net the family, so giving them an email with details on who to contact if the pain increases and how to seek emergency care from your (GDP) and how to contact the paediatric department”. (P005, 26, F)

“I think it just very much depends on the parent and their level of understanding level of health awareness. Because I think some patients will follow instructions. They'll understand the importance of sticking to a routine and that kind of thing. And I think other families who are maybe less well educated or more vulnerable, or sometimes even I've had parents say they can't afford to buy the medications. You do get some families who are like I can't pay the 3 pounds 50 for the bottle of painkiller because it's too much money. So, you know things like that where you have to think about. Do we need to prescribe that for them so they can actually comply with the instructions?”. (P007, 22, F)

“The whole face to face communication, looking at their body language, facial expression, all of those things. It's much easier to pick up on those things as a sign of adherence”. (P010, 11, F)

“I think that that's a very difficult one, because we know that parents even if we want to say for example, to brush the teeth twice a day, compliance is very variable, and generally it's not great. But I think ultimately, we want to do treatment as well, because we're just relying on the parent doing manage everything until the system figures out when it would be appropriate for the child to be seen” (P011, 25, F)

*Are parents already aware on how to deal with pain at home before speaking/seeing a paediatric dentist?*

All responders felt parents are aware of how to manage pain at home usually with painkillers and contacting the local dentist, some clinicians elaborated on why parents or carers would still seek care from a paediatric dentist if they were managing pain at home which is mostly because parents are keen to have an actual procedural dental treatment. Some of the responses mentioned valuable points that may need further exploration for the purposes of this study:

“I think it depends where the pain is coming from. I think if it's like a toothache, I think that's such a common problem, and most people have experienced that at some point in their lives. I haven't come across any parent that haven't thought of doing that by themselves. I think sometimes with more complicated problems like say for example, (TMJ) disorders or to sensitivity, or that kind of thing where it's not as obvious. then maybe parents are not as aware of things that they can do at home”. (P007, 22, F)

“I guess they are aware, and whenever they contact us, they just either need to explore the appointments or need another layer of reassurance, or just need to share information with us”. (P008, 10, M)

“If it's their first child, they will always need some kind of support”. (P009, 9, M)

“I think that parents generally do know how to deal with pain at home, because I think children from a young age have pain, whether it's pain with teething, they get infections, coughs, colds, you know they have bumps and bangs, so I think that parents do know how to deal with these situations”. (P011, 25, F)

*Do you think paediatric dentists should follow up with parents/carers on the effectiveness of non-procedural pain?*

Responses divided between in favour of and against following up on the effectiveness of the instructions given. To reflect to those against the following up if the patient is compliant with the non-procedural pain management instructions given:

“Parents have the ability to contact anyone involved, whether in the actual department or with any local dentist. so it is important that we provide further information. But I don't think it has to be like a set requirement”. (P001, 6, F)

“Realistically, there's only so much time that we can all allocate for reviews. If a child is reporting pain and has a dental problem, then we need to get on and see them physically face to face as soon as possible so that we can move forward with the treatment and management of that problem. So in an ideal world, if it was a telephone assessment, you'd want to see them very soon afterwards rather than following up with a another pain assessment. But on a different level, if you've done



treatment, and you're assessing how a patient is coping with the pain post treatment from a painful procedure, then I think a follow up is very valid". (P003, 33, F)

"I'm not sure that it doesn't just add in another level of admin work where it's actually the thing that's really going to manage is pain is to finish the treatment. So I believe what one needs the most is to have a system of prioritizing patients. I think, for our special needs children particularly, and maybe some of the children with really challenging behaviour like the children's with autism, caring for them is really difficult. It would be a safe call to have some follow up just to check in with the family almost for a safeguarding holistic care. It's just to make sure that everyone's okay. And if it's not working you can get them quickly". (P005, 26, F)

"Not necessarily the dentist. They can do probably something more important like talking to new patients or treating patients in clinic". (P008, 10, M)

Reflecting on the participants who were in favour of following with the patient if they are compliant with the non-procedural instructions given:

"I think in an ideal world yes, but just logistically, it's just not possible". (P011, 25, F)

"Well, I'm not sure if it's the paediatric dentist's job or the local dentist job but definitely someone needs to follow up with that with the family". (P012, 8, F)

"Yes, by phone or remotely, we need to make sure that the patient become more relaxed and comfortable, especially if it's not feasible to see them soon due to exams or living far from the practice". (P004, 7, M)

"If it's someone that's been referred to have dental treatment under general anaesthetic or a sedation and they're in pain, if they're autistic or have any other special needs or for example self-harming, or they stop eating altogether that will massively have an impact on that child in the sense that they will potentially stop eating. Or end up with a serious and difficult disruptive behaviour. You might want to see that child much quicker. I think ideally, somebody should follow them up. I'm not necessarily sure that that right person is the paediatric dentist". (P010, 11, F)

At the beginning of the interview, participants were asked to state how many years they have been qualified as a dentist and how many years they have been treating

children. Participants varied between 32 years and 3 years as qualified dentist, and between 30 to 1.5 years of working with children for dental treatment.

All participants had no more than 3 years of telephone appointment experience due to the fact that tele-dentistry appointments started mainly at the Eastman Dental Hospital during the COVID-19 pandemic in 2020. The least experienced participants had one year of telephone appointments with trainees who recently joined the paediatric department at the Eastman Dental Hospital for postgraduate specialty training.

Based on the interview responses, several themes and sub-themes emerge related to the perceptions, challenges, and practices of paediatric dentists regarding non-procedural pain management in children.

### 3.3.5 Theme 1: Dentist's Perception of Baseline Pain Assessment

#### **Sub-theme 1.1: Assessment Tool Usage**

- *Non-users*: Some paediatric dentists do not employ formal non-procedural pain assessment tools, relying instead on pain history and verbal communication.
- *Users of (NRS)*: Others use the Numeric Pain Rating Scale (NRS) alongside pain history for assessment.

#### **Sub-theme 1.2: Asking the Child or Parent**

- *Child-Centred*: Most paediatric dentists preferred to ask the child, especially if age-appropriate, as they are the ones experiencing the pain.
- *Dual Approach*: Some paediatric dentists chose to ask both the child and the parent, recognising that each may provide valuable information.
- *Parental Perspective*: Paediatric dentists considered that parents' pain thresholds might differ from their child's, impacting the assessment.

#### **Sub-theme 1.3: Challenges in Assessment**

- *Subjectivity*: Paediatric dentists acknowledged the subjective nature of non-procedural pain assessment, particularly in children.
- *Fear and Anxiety*: Some children may not express non-procedural pain due to fear or anxiety associated with dental visits.
- *Previous Experience*: Paediatric dentists differentiated between assessing pain in children with prior dental experience and those without.
- *Communication Barriers*: Challenges in obtaining accurate assessments included language barriers, non-verbal children, and children not openly expressing pain.

### 3.3.6 Theme 2: Challenges in Non-Procedural Pain Assessment

#### **Sub-theme 2.1: Age and Developmental Stage**

- *Young Age*: The young age of patients can hinder the effectiveness of pain assessment.
- *Developmental Differences*: Paediatric dentists emphasise that every child's pain tolerance and communication abilities vary.

#### **Sub-theme 2.2: Communication Barriers**

- *Non-Verbal Children*: Paediatric dentists faced challenges when assessing pain in non-verbal children or those with communication difficulties.
- *Language Barriers*: Language differences can hinder effective pain assessment and communication with parents.

#### **Sub-theme 2.3: Pain Threshold Variability**

- *Threshold Variability*: Paediatric dentists noted that children have varying pain thresholds, making assessment complex.
- *Parental Perception*: Parents may overestimate or underestimate their child's pain based on their own experiences.

#### **Sub-theme 2.4: Inconsistencies in Pain History**

- *Discrepancies*: Paediatric dentists encounter inconsistencies in pain history provided by parents and children, which can pose challenges in assessment.

### 3.3.7 Theme 3: Decision Making in Non-Procedural Pain Management

#### **Sub-theme 3.1: Effectiveness of Non-Procedural Pain Management**

- *Mixed Efficacy*: Paediatric dentists had varying opinions on the effectiveness of non-procedural pain management.
- *Temporary Relief*: Some paediatric dentists viewed non-procedural pain management as a means to provide temporary relief while awaiting definitive treatment.
- *SubPain Management Approaches*: Paediatric dentists employed a combination of techniques, including pharmacological, behavioural, and psychological approaches.

#### **Sub-theme 3.2: Challenges in Providing Non-Procedural Pain Management**

##### **Instructions**

- *Patient Expectations*: Paediatric dentists faced challenges when patients expect immediate treatment rather than non-procedural pain management.
- *Complex Cases*: Managing dental pain in complex cases like MIH or severe caries was challenging.
- *Medication Accessibility*: Paediatric dentists considered the financial constraints of some parents in accessing prescribed pain medications.

### 3.3.8 Theme 4: Perception of How Parents/Carers Manage Pain at Home

#### **Sub-theme 4.1: Parental Awareness**

- *Toothache Management*: Paediatric dentists believed parents were generally aware of how to manage toothache at home with over-the-counter painkillers.
- *Complex Conditions*: Parental awareness may vary for more complex conditions like TMJ disorders or tooth sensitivity.

## Sub-theme 4.2: Follow-Up on Non-Procedural Pain Management

- *Differing Opinions*: Paediatric dentists had mixed opinions on the necessity of follow-up regarding non-procedural pain management.
- *Practicality*: Some paediatric dentists believed that practical constraints limit the feasibility of follow-ups.
- *Special Needs and Vulnerable Patients*: Paediatric dentists emphasised the importance of follow-up for special needs and vulnerable patients to ensure holistic care and safeguarding.

These thematic breakdown of the interview responses of the participating paediatric dentists highlights the complex nature of assessing and managing non-procedural pain in paediatric dentistry, taking into account patient age, communication challenges, and the role of parents or carers in the process. Paediatric dentists recognize the importance of effective non-procedural pain management but acknowledge the practical limitations and variability in patient responses.

## 3.4 Discussion

The findings from the interview highlighted several key themes and sub-themes that collectively emphasised the complexities of this critical aspect of dental care for children.

Theme 1, centred on the dentist's perception of baseline pain assessment, explained the various approaches taken by paediatric dentists in assessing pain. Some relied on verbal communication and pain history, while others incorporated formal tools like the Numeric Pain Rating Scale (NRS). The preference for involving the child in this assessment process, whenever possible, was a recurring sub-theme, recognising their unique perspective as the ones experiencing the pain. It might be beneficial to standardise a pain assessment tool that will assist in the process of pain management along with other factors such as pain history and patient concerns. From this interview we can establish that the NRS pain scale was the only tool that was used and preferred by the paediatric dentist. Standardising the NRS as baseline

non-procedural pain assessment tool could be a good start to evaluate its effectiveness of standardising a pain assessment tool.

Theme 2 emphasised challenges in non-procedural pain assessment, stressing the impact of age, developmental stages, communication barriers, and pain threshold variability. Paediatric dentists encounter difficulties when assessing non-verbal or communication-challenged children and must navigate potential discrepancies between parental and child-reported pain histories. Further considerations need to be addressed with the current existing assessment tools and their effectiveness with communication- challenged children, and possibly developing a new assessment tool that will better cater for this group of young patients.

When considering decision making in non-procedural pain management, a range of opinions were uncovered. Paediatric dentists often employed a combination of approaches, from pharmacological to behavioural and psychological, to provide relief. Challenges arise when patients expect immediate treatment rather than non-procedural pain management, especially in complex cases. Therefore, having a standardised approach in assessing paediatric patients, such as a systematic way of using the NRS to then provide non-pharmacological and pharmacological advice. This will help manage expectations for when the patient will be seen and what will be done on the day. It was established from the interview that paediatric dentists already do this, yet a clearer policy of this methodology will allow a better evaluation of its effectiveness and whether any modification is recommended.

The perception of how parents/carers manage pain at home revealed that parental awareness varies depending on the nature of the dental condition. While parents are generally seen as capable of managing common toothaches with over-the-counter medications, more complex conditions may pose challenges. The necessity of follow-up regarding non-procedural pain management was met with differing opinions, with practical constraints and the needs of special-needs and vulnerable patients taken into consideration. Will it be helpful to provide parents and carers with the correct tools or checklist to assess and decide on the best pain relief approach? The answer to this is out of the scope of this study yet can provide insight of how involving caregivers can benefit the child in pain.

It has been established that the interview responses provided offer valuable insights into the perceptions and practices of paediatric dentists regarding pain assessment and management in their young patients, in addition to the recommendation for future practices and research based on the interview responses. However, there are several limitations to consider:

### **Single Hospital Setting:**

The responses were based on interviews conducted at a single hospital in London, United Kingdom. This limited geographic scope may not capture the full diversity of perspectives and practices among paediatric dentists in the country or in other regions.

### **Response Bias:**

Participants in the interview do not fully represent all paediatric dentists. Those who agreed to participate may have unique different or experiences that vary from non-participants.

### **Self-Reported Data:**

The responses were based on self-reported information from the interviewed paediatric dentists. These responses may not always accurately reflect their actual practices, and there may be some social desirability bias, where participants provide answers they believe are expected or acceptable.

### **Limited Exploration of Certain Topics:**

Some questions in the interview may not have delved deeply into specific aspects of non-procedural pain assessment and management, potentially missing important aspects and details.

### **Generalization:**

The findings from this interview should be interpreted with caution when attempting to generalize to a broader population of paediatric dentists, especially in different healthcare systems or cultural contexts.

### **Lack of Quantitative Data:**

The responses are qualitative in nature, which makes it challenging to quantify trends, patterns, or prevalence of specific practices.

To address these limitations and provide a more comprehensive understanding of the practices in paediatric dentistry and what are the perceptions related to non-procedural pain assessment and management, it would be beneficial to conduct a larger, more diverse study involving multiple paediatric dental centers, potentially using a mixed-methods approach of qualitative interviews with quantitative surveys or observational data to ensure a more representative and nuanced exploration of the topic.

This qualitative study reflected the different layers of the perception and management of the paediatric dentist in practice. They are aware of how important and effective non-procedural pain assessment and management can be with children and their caregivers yet face different challenges in real life practice due to the subjective nature on non-procedural pain. This research aims to improve the care and management of pain in children before they receive actual treatment by emphasising the need for an individualised patient-centred care that will focus on every child's need and their parents. The results of this study can benefit in guiding the development of strategies, policies and practices that aims in improving the quality of non-procedural pain assessment and management.

## **3.5 Conclusion**

A few reflective points were established from this qualitative study. First, it might be beneficial to standardised a pain assessment tool to use with paediatric patients that will help in the process of non-procedural pain management along with other factors such as pain history and patient concerns. It is also established that the NRS pain scale was the only tool that was used and preferred by the paediatric dentist. Standardising the NRS as baseline non-procedural pain assessment tool could be a good start to evaluate its effectiveness of standardising a pain assessment tool.



Further considerations needs to be addressed with the current existing assessment tools and their effectiveness with communication- challenged children, and possibly developing a new assessment tool that will better cater this group of young patients.

Having a standardised approach in assessing paediatric patients, such as a systematic way of using the NRS then provide non-pharmacological and pharmacological advise, managing expectations on when the patient will be seen and what will be done on the day. It was established from the interview that paediatric dentists already do this, yet a more clear policy of this methodology will allow a better evaluation of its effectiveness and whether any modification is recommended.

Further consideration on whether or not providing carers with the correct tools or checklist to assess and decide on the best pain relief approach would be beneficial or not is something to consider for future studies.

# **4. Chapter Four: Recommendation for Future Studies**

Non-procedural pain is not clearly defined. After reviewing literature for this study, non-procedural pain is usually described as preoperative, pre-procedural, established pain, or sometimes neuropathic pain depending on the context of study. The definition of non-procedural pain can be derived from the definition of procedural pain. For that, we can define non-procedural pain as “the unpleasant sensory and emotional experience that arises from a health condition or an injury which is not associated with a diagnostic or treatment procedure”.

It has been established from the literature that even though there are different validated tools for different age groups in children to assess non-procedural pain (such as the FPS-R, NRS, VAS, Wong-Baker FACES, CAS and FLACC), these tools are not serving its main purpose which is giving better outcomes in pain management practices. Furthermore, there is an increased demand for a solution, especially after the COVID-19 pandemic where no face-to-face appointments were available for months and the oral condition of many children became worse. Dental appointments are now more difficult to secure with the general dental practitioner and a longer waiting periods for those referred to or under the care of a specialist paediatric dentist.

We know that there are different validated pain assessment tools for children, but are they used efficiently by dentists? If so, why are they not helping in steering the clinician to decide on what would be the best non-procedural practice to manage that pain. Are there any other practices in the other healthcare settings that could help dentists manage non- procedural pain in children. These were few of the questions that we answered in this project.

## **4.1 Study Limitations and Recommendations:**

## 4.1.1 Non-procedural Pain Management in Paediatric Patients: A Scoping Review

### 4.1.1.1 Recommendations

It is important to reflect on how the studies included in the scoping review can be reflected to the clinical practice in paediatric dentistry. Despite these pain management studies being conducted in different healthcare settings and for varying settings, their findings can still be utilised to enhance non-procedural pain management practices in paediatric dentistry as outlined below:

It can be ensured that paediatric dentists are well-trained in assessing and managing non-procedural pain, with a focus on a standardised care that can still cater the individual needs of each child and parent. Also, tailoring how paediatric dentists communicate with parents and caregivers, by providing guidance on when to seek dental care for oral pain and emphasizing the importance of early intervention to avoid multiple healthcare visits.

Further exploration of distraction techniques, like using music or providing a calming environment, to reduce anxiety and pain in young patients. CBT may also be integrated into treatment plans to help children cope with dental anxiety and pain.

Paediatric dentists are aware of current guidelines and best practices in pain management, including dosages and types of analgesics recommendations for different age groups. It is necessary to prioritise non-opioid analgesics whenever possible to mitigate the risk of opioid misuse.

Moreover, paediatric dental settings can benefit from implementing guidelines that highlight non-procedural pain assessment as an integral part of care. This can improve the overall quality of paediatric dental care and ensure that the subsequent pain management (procedural or non-procedural) is tailored to the child's needs.

### 4.1.1.2 Limitations

The scoping review offers valuable insights into various aspects of non-procedural pain management practices in different countries. However, like any research, it has its limitations:

Although the topic of pain is broad and subjective, limited studies addressed non-procedural pain assessment and its management in the healthcare setting. Moreover, the data that included non-procedural pain in the context of dentistry and specifically paediatric dentistry was insufficient to understand current practices.

The review includes studies from specific countries (UK, Italy, US, India, Germany, Canada), which may not provide a comprehensive global perspective on non-procedural pain management practices. This geographical bias limits the generalizability of the findings. Also, the included studies encompass various study designs, such as reviews, retrospective studies, clinical trials, and observational studies. Combining studies with different methodologies can make it challenging to draw cohesive conclusions.

The review mentions a pilot study on gut-directed hypnotherapy but does not provide any results or outcomes from this study, making it challenging to understand its relevance to the overall review.

Given that the data extraction was completed in March 2022, updates to include more recent studies is not applicable due to the time frame of this project.

Overall, the studies reviewed in this research provide valuable insights into the multifaceted landscape of non-procedural pain management in pediatric dentistry. Future research should focus on addressing the identified gaps and building upon the existing knowledge to enhance the quality of pain management for young dental patients.

#### [4.1.2 Assessment of Paediatric Dentists Views on Non-procedural Pain Assessment and Non-Procedural Pain Management: A Qualitative Study](#)

##### [4.1.2.1 Recommendations](#)

Based on the interview responses and the identified themes, there are several recommendations for future studies and areas of further exploration:

Investigating the reliability of non-procedural pain assessments conducted by children themselves versus those made by their parents or caregivers, particularly

when the child is unable to communicate effectively due to age or disability. Understanding how closely these assessments align and the impact on treatment decisions could be valuable.

Exploring communication barriers that affect the accuracy of pain assessment in paediatric dentistry. This could involve studying the impact of language barriers, cultural differences, and the use of interpreters on non-procedural pain assessment and management.

Further research is needed to assess the long-term effectiveness of non-procedural pain management strategies at home. This could include evaluating whether these strategies lead to improved patient comfort, better oral hygiene, and reduced complications. Also, investigating factors influencing parental adherence to non-procedural pain management instructions. Understanding why some parents may struggle to follow these instructions, including financial barriers, comprehension difficulties, or other challenges, can inform the development of more effective guidance.

Exploring the feasibility and benefits of follow-up protocols after non-procedural pain management instructions are given. Determining who is best suited to conduct follow-up (e.g., paediatric dentist, local dentist) and assess the impact of follow-up on patient outcomes and satisfaction. Furthermore, investigating strategies to enhance patient-centered care in paediatric dentistry, particularly for children with special needs or challenging behaviors. This could involve examining how non-procedural pain assessment and management can be tailored to individual patient needs and preferences.

Assessing the effectiveness of educational and training programs for paediatric dentists in non-procedural pain assessment and non-procedural pain management. Evaluating whether improved training leads to better patient outcomes and more confident practitioners.

Given the increasing use of tele-dentistry, exploring how non-procedural pain assessment differs in tele-dentistry consultations compared to face-to-face visits would be beneficial for better future practices. Investigating the challenges and

benefits of assessing non-procedural pain remotely also will have value to current practices.

Investigating the role of cultural competence in non-procedural pain assessment and management in paediatric dentistry. Exploring how cultural beliefs and practices influence pain perceptions and the effectiveness of non-procedural pain management strategies.

By addressing these areas in future research studies, pediatric dentistry can improve its non-procedural pain assessment and management practices, leading to better outcomes and experiences for young patients and their families.

#### **4.1.2.2**      Limitations:

This limited geographic scope may not capture the full diversity of perspectives and practices among paediatric dentists in the country or in other regions and do not fully represent all paediatric dentists. Those who agreed to participate may have unique different or experiences that vary from non-participants. Some questions in the interview may not have delved deeply into specific aspects of non-procedural pain assessment and management, potentially missing important aspects and details. Additionally, the responses are qualitative in nature, which makes it challenging to quantify trends, patterns, or prevalence of specific practices.

To address these limitations, it would be beneficial to conduct a larger, more diverse study involving multiple paediatric dental centers, potentially using a mixed-methods approach of qualitative interviews with quantitative surveys or observational data to ensure a more representative and nuanced exploration of the topic.

## **4.2 Conclusion**

Non-procedural pain management is not a novel concept, and it is usually practised in different healthcare domains as part of a patient centred care. In paediatric dentistry non-procedural pain management involves instructions, advise, pharmacological and non-pharmacological management of the pain of dental origin. After the COVID-19 pandemic, this type of remote, contact free and procedure free management became more adapted, yet how much it can help is still unconfirmed and no clear previous literature to base upon.

This study has reflected several important points for consideration. First, there's a suggestion that standardising a pain assessment tool for paediatric patients could be advantageous. This standardisation would aid in the management of non-procedural pain while considering factors like the patient's pain history and concerns.

Particularly, the NRS pain scale emerged as the only tool used and preferred by paediatric dentists. Starting with standardising the NRS as the basic tool for non-procedural pain assessment could be a promising initial step in evaluating the effectiveness of a standardized pain assessment tool.

Moreover, it's essential to explore how existing assessment tools perform, particularly with communication-challenged children. Potentially developing a new assessment tool specifically tailored to meet the needs of this group of young patients may be needed.

Establishing a standardised approach to assess paediatric patients is crucial. This approach could involve a systematic process, such as initially using the NRS, followed by offering both non-pharmacological and pharmacological recommendations. Additionally, setting clear expectations regarding when the patient will be seen, and the procedures planned for that day is important. While it was mentioned in the interviews that paediatric dentists already follow this approach, formalising it with a clearer policy would facilitate better evaluation of its effectiveness and the potential need for adjustments.

Standardizing follow up care and advice for families would also be beneficial, especially with long waits to be seen for dental care. The increasing use of tele dentistry may facilitate this approach to follow up for non-procedural pain management in children.

Furthermore, it's worth considering whether caregivers should be provided with appropriate tools or checklists to assess and make decisions regarding the best pain relief approach. This aspect should be taken into account in future research studies.

More studies are needed to assess and analyse the current practices of paediatric dentist and learn from different experiences then confirm and validate which practices are feasible and effective and improve the practices that don't do much in helping patients with their pain until they are planned to receive a definitive



procedural management and treatment of the concerning dental issue. In this study, along with reflecting on previous studies, the perception and experience of the paediatric dentist was stated and reflected with notes on what are the challenges, and what they wish to improve, and their views on what doesn't work. Yet more needs to be covered and analysed for a better pain management experience that is convenient for all parties. Exploring the perception of parents and paediatric patients views on non-procedural pain assessment and non-procedural pain management is highly recommended and needed to better tailor pain management that is more standardised and individualised to what the patient wants.

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# 6. APPENDICES

## 6.1 Appendix A: Data Extraction Tool

<b>Study Number</b>	<b>1</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://dx-doi-org.libproxy.ucl.ac.uk/10.23750%2Fabm.v91i12-S.10618">https://dx-doi-org.libproxy.ucl.ac.uk/10.23750%2Fabm.v91i12-S.10618</a>
<b>Article Title</b>	Assessment and pain management during the triage phase of children with extremity trauma. A retrospective analysis in a Pediatric Emergency Room after the introduction of the PIPER recommendations
<b>Extracted by</b>	D. Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2020
<b>Country</b>	Italy
<b>Authors and affiliations (list as presented on paper)</b>	Carlotta Granata <sup>1</sup> , Massimo Guasconi <sup>1-2</sup> , Francesca Ruggeri <sup>1</sup> , Marina Bolzoni <sup>1</sup> , Cinzia Franca Grossi <sup>1</sup> , Giacomo Biasucci <sup>1</sup> , Andrea Cella <sup>1</sup> "Azienda Unità Sanitaria Locale" of Piacenza, Piacenza, Italy; 2 Department of Medicine and Surgery, University of Parma, Piacenza, Italy
<b>Aims and Methods</b>	
<b>Aims</b>	<p>1. Detect a possible increase in the frequency of pain assessment and management during the triage phase after the introduction of the PIPER recommendations on 1 July 2017 in the Piacenza Hos-pital, Emilia-Romagna Region, Italy.</p> <p>2. Detect the progress of the application of these recommendations one year af-ter their introduction to monitor any further improve-ment in health care outcomes in pain treatment.</p>
<b>Methodology</b>	Retrospective observational study
<b>Methods</b>	The data used were extrapolated from the discharge letters of the SDOU of Piacenza Hospital Paediatric Emergency Room (PER) relating to the four months July-August-September-October of the years 2016, 2017 and 2018.
<b>Scoping review PCC</b>	
<b>Population</b>	0-9 y.o, 811 discharge letters were analyzed, of which: 309 referred to 2016, 243 to 2017 and 259 to 2018
<b>Concept (interventions/programmes implemented)</b>	The use of PIPER recommendations (implementend in the hospital 2017): provide for the use of the algometric scales FLACC, WONG-BAKER and NRS based on the age of the child, and the administration of analgesics by the nurse, based on protocols shared by the team, if the score obtained is > 4 in children with extremity trauma.
<b>Context</b>	the Piacenza Hospital, Paediatric Emergency Room (PER)
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Introduction of the PIPER best practice recommendations



<b>Results of the implemented pain management practice</b>	<p>1. The percentage of patients who were administered with an algometric assessment scale during the triage phase increased, exceeding 90% both in 2017 and in 2018.</p> <p>2. Increase in patients treated pharmacologically for pain.</p>
<b>Conclusion/recommendations</b>	The implementation of PIPER recommendations, or similar projects, and the continuous updating of professionals on the management of pain symptoms is therefore strongly recommended for all PERs.

<b>Study Number</b>	<b>2</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://dx-doi-org.libproxy.ucl.ac.uk/10.1155%2F2020%2F5476425">https://dx-doi-org.libproxy.ucl.ac.uk/10.1155%2F2020%2F5476425</a>
<b>Article Title</b>	Opioids are rarely prescribed for children with acute nonprocedural pain in Italian Emergency Departments
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Brief Report
<b>Year of publication</b>	2018
<b>Country</b>	Italy
<b>Authors and affiliations (list as presented on paper)</b>	E Castagno, A F Urbino, R L Mancusi, F Benini, on behalf of the PIERRE (Pain practice in Italian pediatric emergency departments) Study Group
<b>Aims and Methods</b>	
<b>Aims</b>	Pain practice in Italian pediatric emergency departments
<b>Methodology</b>	Retrospective study
<b>Methods</b>	Evaluate the prescription and dosage of opioids given to patients up to the age of 14 with acute nonprocedural pain by 18 Italian emergency departments between October 2014 and January 2015
<b>Scoping review PCC</b>	
<b>Population</b>	Patients up to the age of 14 with acute nonprocedural pain, 198 pt's
<b>Concept (interventions/programmes implemented)</b>	Prescription and dosage of opioids given to patients up to the age of 14 with acute nonprocedural pain.
<b>Context</b>	18 Italian emergency departments between October 2014 and January 2015
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Prescription and dosage of opioids for management of acute nonprocedural pain in children.
<b>Results of the implemented pain management practice</b>	<p>1. Codeine plus paracetamol was the most frequently prescribed opioid, while morphine was mainly prescribed in large paediatric hospitals.</p> <p>2. The doses of prescribed opioids were more appropriate than paracetamol and ibuprofen.</p>
<b>Conclusion/recommendations</b>	This study highlights the need for specific training for paediatric emergency departments in small general hospitals.

<b>Study Number</b>	<b>3</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://dx-doi-org.libproxy.ucl.ac.uk/10.1155%2F2020%2F5476425">https://dx-doi-org.libproxy.ucl.ac.uk/10.1155%2F2020%2F5476425</a>
<b>Article Title</b>	Developing a Framework to Support the Delivery of Effective Pain Management for Children: An Exploratory Qualitative Study
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2020
<b>Country</b>	United Kingdom
<b>Authors and affiliations (list as presented on paper)</b>	Joan Simons ,1 Bernie Carter ,2 and Jennie Craske3  1The Open University, Milton Keynes, UK  2Edge Hill University, Ormskirk, UK  3Alder Hey Children's NHS Foundation Trust, Liverpool, UK
<b>Aims and Methods</b>	
<b>Aims</b>	Critically explore practitioners' views of five key elements of pain management:  1. Distributed pain management with vision  2. Effective pain management with less stress  3. Delivered with confidence  4. Individual approach to child and parent  5.Raising parents' expectations of effective pain management and their relevance as a framework for children's pain management and potential for implementation into practice.
<b>Methodology</b>	Exploratory Qualitative Study
<b>Methods</b>	Interpretive, exploratory qualitative two-phase design using focus groups (Phase 1) and interviews (Phase 2), which were carried out either face-to-face or remotely.
<b>Scoping review PCC</b>	
<b>Population</b>	43 practitioners were recruited to the study. We carried out focus groups with band 5 nurses (n =6) and advanced nurse practitioners (n =11) and semistructured interviews with pain nurses (n=16) and consultants (n=10).
<b>Concept (interventions/programmes implemented)</b>	Built on previous work about (the five key elements) that support children's pain management, by exploring their relevance and practical application with 43 healthcare practitioners.
<b>Context</b>	In Phase 1, two groups of nurses working at one tertiary children's hospital and attending specific in-house pain education days were targeted.

	In Phase 2 aimed to recruit experts in pain management (Pain Consultants and Clinical Nurse Specialists) via email invitations to the leading consultant and nurse from each of 17 specialist pain teams in the UK and Ireland via a specialist network (Paediatric Pain Travelling Club), which represents pain teams across the UK and Ireland.
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Findings demonstrated that the following elements were considered to be important: <ol style="list-style-type: none"> <li>1. delivering pain management with confidence,</li> <li>2. supporting colleagues with protocols and guidance,</li> <li>3. empowering parents to be involved in pain management,</li> <li>4. and adopting an individual approach to a child and family.</li> </ol>
<b>Results of the implemented pain management practice</b>	These elements formed the basis of a framework for children's pain management. Some practitioners indicated that pain management required education and more resources, and that the culture of an area could influence pain management practice.
<b>Conclusion/recommendations</b>	The framework brings together elements that have the potential to improve the management of children's pain through its use as an education tool. Each interrelated element of the framework plays an important part in the overall management of children's pain.

<b>Study Number</b>	<b>4</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8208180/pdf/JFMPC-10-1987.pdf">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8208180/pdf/JFMPC-10-1987.pdf</a>
<b>Article Title</b>	Oral pain and infection control strategies for treating children and adolescents in India
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2021
<b>Country</b>	India
<b>Authors and affiliations (list as presented on paper)</b>	Rahul Kaul <sup>1</sup> , H. S. Sandhu <sup>2</sup> , Brijinder Singh Talwar <sup>3</sup> , DMM Chengappa <sup>4</sup> , Atul Bali <sup>5</sup> , Rishu Koul <sup>6</sup> <p>1Dental Officer (Paedodontics and Preventive Dentistry), Field Hospital, Manipur, 2Classified Specialist (Prosthodontics) CMDC, Chandigarh, Punjab, 3Classified Specialist (Prosthodontics) CDU, Nagaland, 4Graded Specialist (Paedodontics and Preventive Dentistry) INHS Sanjivani, Kerala, 5Classified Specialist (Orthodontics) Army Dental Centre Research and Referral, New Delhi, 6Dental Officer, MDC Gopalpur, Odisha, India</p>
<b>Aims and Methods</b>	
<b>Aims</b>	To investigate dentists' attitudes about pain and infection control while treating children and adolescents by assessing their recommendations of pre- and postoperative analgesics and antibiotics, and use of local anesthesia (LA) for definitive treatment in different clinical scenarios.
<b>Methodology</b>	Descriptive and analytical cross-sectional study

<b>Methods</b>	General dental practitioners (GDPS) as well as specialist dentists, were surveyed over a period of 2 months by using a pre-tested close-ended questionnaire. The data was statistically analyzed using Pearson's Chi-square test and backward logistic regression analysis for analysis of categorical variables and independent variables, respectively. Level of significance was set at 5%.
<b>Scoping review PCC</b>	
<b>Population</b>	276 dentists out of 400
<b>Concept (interventions/programmes implemented)</b>	Questionnaire was divided into 3 parts:  Part 1 – Demographic data of the participant  Part 2- Questions related to imaginary clinical scenarios like: restoration, extraction and traumatic dental injury involving primary as well permanent teeth.  Part 3– Questions regarding most commonly used preoperative analgesics and antibiotics, if any, and duration prior to treatment, when they were administered.  Responses to questions were obtained in form of a 5-point likert scale which was then dichotomized for statistical analysis.
<b>Context</b>	Online link of the present study was mailed to 400 dentists, out of which 276 dentists responded to the study, thereby achieving a response rate of 70%
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Pre-and postoperative use of analgesics and antibiotics
<b>Results of the implemented pain management practice</b>	Most commonly used preoperative analgesics, whenever used, was paracetamol, while most commonly prescribed preoperative antibiotic was amoxicillin. Majority of GDPS and specialist dental practitioners who advocated use of preoperative analgesics and antibiotics recommend their administration half an hour prior to commencement of dental treatment.
<b>Conclusion/recommendations</b>	Dependence on antibiotics and analgesics for achieving pain and infection control in children has to be minimized and focus has to be shifted on judicious definitive treatment involving use of LA, aseptic techniques, and behavior management techniques.

<b>Study Number</b>	<b>5</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://www.frontiersin.org/articles/10.3389/fdmed.2021.748089/full">https://www.frontiersin.org/articles/10.3389/fdmed.2021.748089/full</a>
<b>Article Title</b>	Practical Applicability of Teledentistry in Pediatric Patients Amidst Pandemic : A Narrative Review
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2021
<b>Country</b>	India

<b>Authors and affiliations (list as presented on paper)</b>	Mousumi Goswami <sup>1*</sup> , Tanu Nangia <sup>1</sup> , Aditya Saxena <sup>1</sup> , Sakshi Chawla <sup>1</sup> , Anam Mushtaq <sup>1</sup> , Shrey R. Singh <sup>2</sup> and Palak Jain <sup>1</sup>  1I.T.S Dental College, Hospital and Research Centre, Noida, India  2School of Medical Science and Research, Sharda University, Noida, India
<b>Aims and Methods</b>	
<b>Aims</b>	Propose a sound model of less technique sensitive, safe and handy strategies for dental traumatic injuries, endodontic and restorative concerns, and orthodontic urgencies until complete clinical help can be sought
<b>Methodology</b>	Narrative review
<b>Methods</b>	Five hundred thirty articles were obtained from the PubMed, Google Scholar, Embase, Lilacs, and Cochrane databases published from 2011 to 2021. Nineteen articles that described teledentistry in the COVID-19 era were included. Full texts of only 147 articles were retrieved and screened for further eligibility.
<b>Scoping review PCC</b>	
<b>Population</b>	Paediatric Patients
<b>Concept (interventions/programmes implemented)</b>	Practical implementation of teledentistry service in the COVID-19 era
<b>Context</b>	Dentistry, pediatric or general dentistry, triaging of patients, guidelines, protocol, and reviews from clinical experience
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Adoption of teledentistry
<b>Results of the implemented pain management practice</b>	Teledentistry can serve as a vital patient management strategy that aids in triaging urgent and elective patient treatment needs, ultimately easing the burden of clinics and at the same time providing a safer means of consultation.
<b>Conclusion/recommendations</b>	Propose a model of teledentistry-assisted management of pediatric dental problems during the COVID-19 pandemic that can be augmented with video-based and live teleconsultation demonstrations in order to minimize the need for dental clinic visits. It includes at-home recommendations for non-emergency concerns that can be disseminated via teleconsultation mode for parents and caregivers.

<b>Study Number</b>	<b>6</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<Go to ISI>://WOS:000527877700023  <a href="https://www.sciencedirect.com/science/article/abs/pii/S0965229919312476?via%3Dihub">https://www.sciencedirect.com/science/article/abs/pii/S0965229919312476?via%3Dihub</a>
<b>Article Title</b>	Preliminary evaluation of the clinical implementation of cognitive-behavioral therapy for chronic pain management in pediatric sickle cell disease
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article

<b>Year of publication</b>	2020
<b>Country</b>	USA
<b>Authors and affiliations (list as presented on paper)</b>	Soumitri Sila,b,*, Kristina Laib, Jennifer L. Leea,b, Jordan Gilleland Marchaka,b, Beth Thompsona,b, Lindsey Cohenb,c, Peter Lanea,b, Carlton Dampiera,b  1. Emory University School of Medicine, Department of Pediatrics, United States  2. Children's Healthcare of Atlanta, Aflac Cancer and Blood Disorders Center, United States  3. Georgia State University, Department of Psychology, United States
<b>Aims and Methods</b>	
<b>Aims</b>	Evaluate the implementation of cognitive-behavioral therapy (CBT) for chronic pain in a clinical setting by comparing youth with sickle cell disease (SCD) who initiated or did not initiate CBT.
<b>Methodology</b>	Exploratory Study
<b>Methods</b>	Children with SCD (ages 6–18; n = 101) referred for CBT for chronic pain were compared based on therapy attendance: Established Care; Early Termination; or Comparison (i.e., did not initiate CBT).
<b>Scoping review PCC</b>	
<b>Population</b>	Children with SCD (ages 6–18; n = 101)
<b>Concept (interventions/programmes implemented)</b>	Standardised CBT delivery
<b>Context</b>	Outpatient pediatric psychology and comprehensive SCD clinics in 3 locations at a southeastern children's hospital
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Standardised CBT delivery in SCD paediatric patients with chronic pain.
<b>Results of the implemented pain management practice</b>	1. Adjusting for age, genotype, and hydroxyurea, early terminators of CBT had increased rates of admissions and hospital days over time relative to comparisons; those who established care had faster reduction in admissions and hospital days over time relative to comparisons.  2. Emergency department reliance (EDR) decreased by 0.08 over time for Established Care and reduced by 0.01 for every 1 completed session.  3. Patients who completed pre- and post-treatment PROs reported decreases in typical pain intensity, functional disability, and improved coping efficacy.
<b>Conclusion/recommendations</b>	Establishing CBT care may support reductions in admissions for pain, length of stay, and EDR for youth with chronic SCD pain, which may be partially supported by patient-reported improvements in functioning, coping, and lower pain intensity following CBT.

<b>Study Number</b>	<b>7</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	Document Control Number CPG/003/03
<b>Article Title</b>	Acute Pain Management in Children and Young People

<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	UCLH Guideline Trust Wide
<b>Year of publication</b>	2020
<b>Country</b>	United Kingdom
<b>Authors and affiliations (list as presented on paper)</b>	Dr Andrea Leigh, Dr Penny Salt, Dr Jamie Smart, Dr Sara Trompeter, Dr Sarah Trippick, Dr Sara Polhill, Dr Sara Stoneham, Kerstin von Both, Sonali Bose
<b>Aims and Methods</b>	
<b>Aims</b>	To provide guidance for healthcare professionals on the identification, assessment, treatment and management of acute pain in paediatric and young people attending UCLH
<b>Methodology</b>	Clinical guideline
<b>Methods</b>	Clinical guideline
<b>Scoping review PCC</b>	
<b>Population</b>	Children and young people (0-19 years of age)
<b>Concept (interventions/programmes implemented)</b>	Management of acute pain from a multi-disciplinary approach, encompassing both pharmacological and non-pharmacological methods of pain management in children and young people up to 19 years of age
<b>Context</b>	This guidance applies to all healthcare staff involved in the treatment of patients under the age of 18 years treated at UCL Hospitals and adults aged 18 and 19 years treated on the Paediatric wards (T11 and T12) and the TYA unit. Staff refers to all employees or contractors of UCLH or other external organisations that provide services to the Trust.
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Pharmacological and non-pharmacological pain management depending on pain score and type of pain (non-procedural- procedural- postprocedural)
<b>Results of the implemented pain management practice</b>	There is a wide spectrum of cognitive ability and chronological age in children and young people which necessitates an individualised approach to the assessment and management of pain
<b>Conclusion/recommendations</b>	Recommendations for treatment in this guideline are intended to broadly cover the spectrum of patients seen at UCLH, therefore individual patient factors (e.g. allergies, contraindications, co-morbidities) should also be taken into consideration when treating and assessing acute pain.

<b>Study Number</b>	<b>8</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://onlinelibrary-wiley-com.libproxy.ucl.ac.uk/doi/epdf/10.1111/cch.12633">https://onlinelibrary-wiley-com.libproxy.ucl.ac.uk/doi/epdf/10.1111/cch.12633</a>
<b>Article Title</b>	Soap bubbles as a distraction technique in the management of pain, anxiety, and fear in children at the paediatric emergency room: A pilot study
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article

<b>Year of publication</b>	2019
<b>Country</b>	Italy
<b>Authors and affiliations (list as presented on paper)</b>	Claudio Longobardi, Laura E. Prino, Matteo A. Fabris, Michele Settanni
<b>Aims and Methods</b>	
<b>Aims</b>	Assess the effectiveness of soap bubbles as a distraction technique for the management of anxiety, fear, and pain in children waiting for a medical examination at the paediatric emergency room.
<b>Methodology</b>	Pilot study
<b>Methods</b>	A parallel trial design with a sample consisting of 74 children (M = 9.30; SD = 1.10; 50% female) randomly assigned to either a control or experimental group. The children in the experimental group underwent the soap bubble protocol while waiting for a medical examination at the paediatric emergency room. Anxiety, fear, and pain were assessed by self-report administered to the children before the triage and the application of the soap bubbles (baseline), after the application of the soap bubbles (T1), and after the medical examination (T2).
<b>Scoping review PCC</b>	
<b>Population</b>	74 children
<b>Concept (interventions/programmes implemented)</b>	Two-arm parallel design randomized trial carried out in the emergency department of a paediatric hospital that compares standard care (SC) with an intervention based on the use of soap bubbles (SB) for preventing or reducing fear, anxiety, and pain in children before and after their medical examination.
<b>Context</b>	Emergency department of a paediatric hospital
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	The use of soap bubbles (SB) for preventing or reducing fear, anxiety, and pain in children before and after their medical examination
<b>Results of the implemented pain management practice</b>	The children in the experimental group showed a significant reduction of perceived pain while waiting for the medical examination (T1), whereas no difference was found after the medical examination (T2). Furthermore, the children in the experimental group showed a significant reduction in fear (T1 and T2), whereas no difference was found in the anxiety scores measured by the Child Anxiety.
<b>Conclusion/recommendations</b>	The use of soap bubbles is a good distraction technique in the reduction of fear and the perception of pain in children awaiting a medical examination at the paediatric emergency room.

<b>Study Number</b>	<b>9</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://oce-ovid-com.libproxy.ucl.ac.uk/article/00006565-201902000-00001/HTML">https://oce-ovid-com.libproxy.ucl.ac.uk/article/00006565-201902000-00001/HTML</a>
<b>Article Title</b>	A Comparison of Nonpharmacologic Interventions on the Emotional State of Children in the Emergency Department
<b>Extracted by</b>	D. Alkattan
<b>Checked by</b>	P. Ashley



<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2019
<b>Country</b>	Italy
<b>Authors and affiliations (list as presented on paper)</b>	Elena Antonelli, BSc,* Laura Vagnoli, MSc,*† Enrica Ciucci, PhD,‡ Chiara Vernucci, BSc,* Federica Lachi, BSc,* and Andrea Messeri, MD*  Pain Therapy & Palliative Care and †Pediatric Psychology Service, Meyer Children's Hospital; and ‡Department of Education and Psychology, University of Florence, Florence, Italy.
<b>Aims and Methods</b>	
<b>Aims</b>	Investigate the efficacy of 3 different nonpharmacologic interventions (clowns, dogs, and musicians) to reduce pain and analyze the perception of positive and negative affects after the presence of these activities in a short-stay observation unit (SSOU).
<b>Methodology</b>	Randomized study
<b>Methods</b>	Participants were composed of 105 children (54 boys and 51 girls; aged 3–16 years) assigned randomly to an experimental group (N = 57) that was composed of patients who were present in the SSOU.  They received one of the following nonpharmacologic interventions: clowns (n = 18), dogs (n = 24), or musicians (n = 15) or they were assigned to a control group (CG) (N = 48) that consists of the patients who were present in the SSOU without the presence of nonpharmacologic interventions.
<b>Scoping review PCC</b>	
<b>Population</b>	105 children
<b>Concept (interventions/programmes implemented)</b>	Patients received one of the following nonpharmacologic interventions: clowns (n = 18), dogs (n = 24), or musicians (n = 15) or they were assigned to a control group (CG) (N = 48) that consists of the patients who were present in the SSOU without the presence of nonpharmacologic interventions.
<b>Context</b>	Emergency department, short-stay observation unit (SSOU).
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	3 different nonpharmacologic interventions (clowns, dogs, and musicians) to reduce pain
<b>Results of the implemented pain management practice</b>	Differences among the groups did not emerge; in fact, the 3 interventions have a similar influence in a different way on a child's wellbeing.  No significant main effect about pain emerged for both groups across age and sex.
<b>Conclusion/recommendations</b>	The presence of different nonpharmacologic interventions (clowns, dogs, and musicians) seemed to empower positive affect in children but did not influence the self-reported pain.

<b>Study Number</b>	<b>10</b>
<b>Bibliographic Information</b>	

<b>Study ID</b>	<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5855301/pdf/bmjopen-2017-020771.pdf">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5855301/pdf/bmjopen-2017-020771.pdf</a>
<b>Article Title</b>	Children's toothache is becoming everybody's business: where do parents go when their children have oral pain in London, England? A cross-sectional analysis
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2018
<b>Country</b>	United Kingdom
<b>Authors and affiliations (list as presented on paper)</b>	<p>Vanessa Elaine Muirhead,<sup>1</sup> Zahidul Quayyum,<sup>2</sup> Donal Markey,<sup>3,4</sup> Sally Weston-Price,<sup>1</sup> Annette Kimber,<sup>3</sup> Wayne Rouse,<sup>3</sup> Cynthia M Pine</p> <p>1. Centre for Dental Public Health and Primary Care, Institute of Dentistry, Queen Mary University of London, London, UK</p> <p>2. Centre for Primary Care and Public Health, Blizard Institute, Queen Mary University of London, London, UK</p> <p>3. Dental, Optometry and Pharmacy Commissioning, NHS England London Region, London, UK</p> <p>4Children &amp; Young People Programme, Healthy London Partnerships, London, UK</p>
<b>Aims and Methods</b>	
<b>Aims</b>	To assess the number of parents who visited community pharmacies in London seeking pain medications for their children's pain and specifically for oral pain, to identify which health services parents contacted before their pharmacy visit and to estimate the cost to the National Health Service (NHS) when children with oral pain who visit pharmacies also see health professionals outside dentistry.
<b>Methodology</b>	Cross-sectional study
<b>Methods</b>	A survey administered by pharmacy staff to participants and a guidance pack. Pharmacy staff approached any parents, carers or adolescents who were purchasing or collecting any paediatric pain medication regardless of the child's pain complaint. They asked all of the participants the eight survey questions and recorded their responses on the online survey.
<b>Scoping review PCC</b>	
<b>Population</b>	Parents, carers and adolescents purchasing over-the-counter pain medications or collecting pain prescriptions for children (0–19 years)
<b>Concept (interventions/programmes implemented)</b>	The number of parents who visited pharmacies seeking pain medications for their children's pain and oral pain and the number of parents who contacted health professionals outside dentistry before their pharmacy visit. Estimated costs of visits by children with oral pain to health professionals outside dentistry.
<b>Context</b>	1862 pharmacies in London in November 2016– January 2017
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Parents who visited pharmacies seeking pain medications for their children's pain and oral pain and the number of parents who contacted health professionals outside dentistry before their pharmacy visit

<b>Results of the implemented pain management practice</b>	<p>1. Oral pain was the most common reason for parents to seek pain medications from pharmacies for their children over 10 weeks. Nearly two-thirds (65%) of the parents sought pain relief for a child who had oral pain at the time of the visit to the pharmacy.</p> <p>2. Only 30% of the children with oral pain had seen a dentist before they visited the pharmacy. Contact with dentists also varied by the oral pain type and the age of the child. Twenty-eight per cent of children with oral pain had contacted health professionals and health services outside dentistry before visiting the pharmacy</p>
<b>Conclusion/recommendations</b>	Most parents who visited pharmacies for children's pain medications in London sought pain medications for children's oral pain. Children's inappropriate contact with multiple health services when they have oral pain adds significant costs to the NHS.

<b>Study Number</b>	<b>11</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://www.aapd.org/globalassets/media/policies_guidelines/bp_pain.pdf">https://www.aapd.org/globalassets/media/policies_guidelines/bp_pain.pdf</a>
<b>Article Title</b>	Pain Management in Infants, Children, Adolescents, and Individuals with Special Health Care Needs
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	AAPD guideline
<b>Year of publication</b>	2018
<b>Country</b>	USA
<b>Authors and affiliations (list as presented on paper)</b>	The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry
<b>Aims and Methods</b>	
<b>Aims</b>	Provides dentists and stakeholders with current best practices for pediatric pain management. Infants, children, adolescents, and individuals with special health care needs may experience pain resulting from dental/orofacial injury, infection, and dental procedures.
<b>Methodology</b>	Literature review
<b>Methods</b>	Review of current dental and medical literature pertaining to pain management in pediatric dental patients. Review of existing federal and professional pain management guidelines and consensus statements.
<b>Scoping review PCC</b>	
<b>Population</b>	Paediatric Patients
<b>Concept (interventions/programmes implemented)</b>	Offer updated information and guidance on pain management in infants, children, adolescents, and individuals with special health care needs
<b>Context</b>	Review of existing federal and professional pain management guidelines and consensus statements were used to assist with this document.
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Perioperative pain management approaches include pre-emptive pain management (e.g., anaesthetics), use of local anesthesia during general anesthesia for post-operative pain control, non-pharmacological anxiolytic interventions (e.g., providing a calm environment,

	emotional support), distraction and imagery (e.g., counting, video games), and pharmacological pain control agents including non-opioid analgesics (e.g., nonsteroidal anti-inflammatory drugs, acetaminophen) and opioid analgesics.
<b>Results of the implemented pain management practice</b>	Acetaminophen and nonsteroidal anti-inflammatory medications are first line pharmacologic therapies for pain management. Use of opioids for pediatric dental patients should be rare, and steps to mitigate opioid misuse are discussed.
<b>Conclusion/recommendations</b>	Infants, children, and adolescents can and do experience pain due to dental/orofacial injury, infection, and dental procedures. Inadequate pain management may have significant physical and psychological consequences for the patient. Adherence to 12 recommendations mentioned in the manual can help practitioners prevent or substantially relieve pediatric dental pain and minimize risk of associated morbidities.

<b>Study Number</b>	<b>12</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD010971.pub2/epdf/full">https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD010971.pub2/epdf/full</a>
<b>Article Title</b>	Psychosocial interventions for recurrent abdominal pain in childhood
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2017
<b>Country</b>	United Kingdom
<b>Authors and affiliations (list as presented on paper)</b>	Rebecca A Abbott <sup>1</sup> , Alice E Martin <sup>2</sup> , Tamsin V Newlove-Delgado <sup>1</sup> , Alison Bethel <sup>1</sup> , Joanna Thompson-Coon <sup>1</sup> , Rebecca Whear <sup>1</sup> , Stuart Logan <sup>1</sup>  1. NIHR CLAHRC South West Peninsula (PenCLAHRC), University of Exeter Medical School, Exeter, UK.  2. Paediatrics, Royal Devon and Exeter Hospital, Exeter, UK
<b>Aims and Methods</b>	
<b>Aims</b>	To determine the effectiveness of psychosocial interventions for reducing pain in school-aged children with RAP.
<b>Methodology</b>	Systematic review
<b>Methods</b>	This review includes 18 randomised controlled trials (14 new to this version), reported in 26 papers, involving 928 children and adolescents with RAP between the ages of 6 and 18 years. The interventions were classified into four types of psychosocial therapy: cognitive behavioural therapy (CBT), hypnotherapy (including guided imagery), yoga, and written self-disclosure.
<b>Scoping review PCC</b>	
<b>Population</b>	928 children and adolescents with RAP between the ages of 6 and 18 years
<b>Concept (interventions/programmes implemented)</b>	Any intervention based on psychological or behavioural theory (a 'psychosocial' intervention). A variety of approaches have been used, including behavioural and cognitive behavioural techniques, psychotherapy, family-centred approaches, multicomponent therapies. A variety of approaches have been used, including behavioural and cognitive behavioural techniques, psychotherapy, family-centred approaches, multicomponent therapies.

<b>Context</b>	Only fully randomised controlled trials (RCTs) were eligible. The control group in the RCT could be usual care, wait-list control, or an active form of control that is not considered to be a psychosocial intervention
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	The interventions were classified into four types of psychosocial therapy: cognitive behavioural therapy (CBT), hypnotherapy (including guided imagery), yoga, and written self-disclosure.
<b>Results of the implemented pain management practice</b>	cognitive behavioural therapy and hypnotherapy may be effective in terms of reducing pain in the short term. There was little evidence of long-term benefit. There was no evidence that either therapy had a beneficial effect on quality of life, daily activities, or psychological outcomes such as anxiety and depression. Yoga therapy and written self-disclosure as a therapy had no effect on pain, quality of life, or daily activities. No adverse effects were reported from any of these therapies.
<b>Conclusion/recommendations</b>	Cognitive behavioural therapy and hypnotherapy warrant consideration by clinicians as part of the management strategy for children with recurrent abdominal pain. The overall quality of the evidence was low to very low. More high-quality research is needed to evaluate the particular aspects of the therapies that are effective and to establish whether benefits are maintained over time.

<b>Study Number</b>	<b>13</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://www.cochranelibrary.com/central/doi/10.1002/central/CN-01554647/full">https://www.cochranelibrary.com/central/doi/10.1002/central/CN-01554647/full</a>
<b>Article Title</b>	RCT Evaluating Intranasal Fentanyl in the Pain Management of Children With Headaches
<b>Extracted by</b>	D. Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2015
<b>Country</b>	Canada
<b>Authors and affiliations (list as presented on paper)</b>	Principal Investigator: Serge Gouin, St. Justine's Hospital Montreal, Quebec, Canada, H3T1C5
<b>Aims and Methods</b>	
<b>Aims</b>	To evaluate pain reduction provided by intranasal fentanyl (INF) compared to placebo in addition to ibuprofen for children presenting to a pediatric ED with moderate to severe headaches.
<b>Methodology</b>	Randomised Clinical Trial
<b>Methods</b>	All children eight to 18 years old who will present to the ED with headaches as a main chief complaint and with pain of $\geq 36$ mm out of 100 on Visual Analog Scale (VAS) will be recruited. Study participants will be randomly allocated to receive INF 1.5 mcg/kg (maximum dose of 100 mcg) or similar volume of a placebo solution via an atomizer. Co-administration of oral ibuprofen 10 mg/kg (maximum dose of 600 mg) will also be provided to the two groups if not received in the previous 4 hours.
<b>Scoping review PCC</b>	
<b>Population</b>	62 participants (8-18 y.o)

<b>Concept (interventions/programmes implemented)</b>	All patients will receive a 1.5 mcg/kg dose of fentanyl or an equivalent volume of similar looking placebo. This will be administered intranasally via a mucosal atomiser device (MAD) using 50 mcg/mL solution with a 2 mL syringe.
<b>Context</b>	pediatric emergency department
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	To evaluate pain reduction provided by intranasal fentanyl (INF) compared to placebo in addition to ibuprofen for children presenting to a pediatric ED with moderate to severe headaches.
<b>Results of the implemented pain management practice</b>	Expected results: study might demonstrate that INF provides additional pain relief for children presenting to an ED with headaches. Providing INF could relieve their symptoms more quickly, potentially improve patient's and family's satisfaction, possibly reduce the length of their ED stay and consequently, have a significant impact on patient quality of care and cost-effectiveness.
<b>Conclusion/recommendations</b>	Not provided

<b>Study Number</b>	<b>14</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://clinicaltrials.gov/ct2/show/NCT02613078">https://clinicaltrials.gov/ct2/show/NCT02613078</a>
<b>Article Title</b>	Hypnotherapy vs. Probiotics in Children With IBS and Functional Abdominal Pain
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2015
<b>Country</b>	Germany
<b>Authors and affiliations (list as presented on paper)</b>	Principal Investigator: Marco D Gulewitsch, PhD, Eberhard Karls University, Tübingen, Germany
<b>Aims and Methods</b>	
<b>Aims</b>	To investigate the influence of gut-directed hypnotherapy and probiotic nutritional supplement (SymbioLact B) on gastrointestinal symptoms in children with functional abdominal pain or irritable bowel syndrome compared to self-observation only.
<b>Methodology</b>	Pilot study
<b>Methods</b>	<p>During the first two weeks ("run-in period") participants will only be keeping their symptom diaries. This data will be used in later analysis as "baseline" data for comparison with any changes that will occur due to intervention. The week three and four are regarded as "wash-out period": participants will be instructed to stop answering questions in diaries.</p> <p>At the end of week four, children will be randomized into one of three groups: based on computer generated table of random numbers each participant will be allocated either to a group practicing a gut-directed hypnosis or receiving a probiotic for the next four weeks (SymbioLact B) or reference group (only symptom diaries).</p>
<b>Scoping review PCC</b>	
<b>Population</b>	60 participants (6-17y.o)

<b>Concept (interventions/programmes implemented)</b>	1. Behavioral: Gut-Directed Hypnotherapy 2. Dietary Supplement: Nutritional Supplement 3. Behavioral: Self-Monitoring
<b>Context</b>	University Hospital Tuebingen
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	To investigate the influence of gut-directed hypnotherapy and probiotic nutritional supplement (SymbioLact B) on gastrointestinal symptoms in children with functional abdominal pain or irritable bowel syndrome compared to self-observation only.
<b>Results of the implemented pain management practice</b>	Not provided/ Change in number of days with pain/discomfort [ Time Frame: baseline, at week 10 and at 3 months follow-up ]
<b>Conclusion/recommendations</b>	Not provided

<b>Study Number</b>	<b>15</b>
<b>Bibliographic Information</b>	
<b>Study ID</b>	<a href="https://emj.bmj.com/content/emjmed/32/4/269.full.pdf">https://emj.bmj.com/content/emjmed/32/4/269.full.pdf</a>
<b>Article Title</b>	A novel multipatient intranasal diamorphine spray for use in acute pain in children: pharmacovigilance data from an observational study
<b>Extracted by</b>	D.Alkattan
<b>Checked by</b>	P. Ashley
<b>Type of publication (journal article, book chapter, grey literature)</b>	Journal article
<b>Year of publication</b>	2015
<b>Country</b>	United Kingdom
<b>Authors and affiliations (list as presented on paper)</b>	Jason Kendall, <sup>1</sup> Ian Maconochie, <sup>2</sup> Ian C K Wong, <sup>3,4</sup> Richard Howard, <sup>5</sup> on behalf of the DIASAFE study  1. Emergency Department, Frenchay Hospital, Bristol, UK 2. Emergency Department, St Mary's Hospital, London, UK 3. Therakind Ltd, London, UK 4. Centre for Paediatric Pharmacy Research, UCL School of Pharmacy, University College London, London, UK 5. Great Ormond Street Hospital, London, UK
<b>Aims and Methods</b>	
<b>Aims</b>	To establish the safety of an intranasal diamorphine (IND) spray in children.
<b>Methodology</b>	An open-label, single-dose pharmacovigilance trial.
<b>Methods</b>	The DIAMorphine SAFETy (DIASAFE) study was a multicentre, open-label, single-dose, pharmacovigilance study in children in the ED
<b>Scoping review PCC</b>	
<b>Population</b>	226 participants, children aged 2–16 years with a fracture or other trauma.

<b>Concept (interventions/programmes implemented)</b>	The nasal spray is designed as a multiuse product with replacement of the paediatric tip and priming between patients. The diamorphine is delivered at a single dose of 0.1mg/kg±20%, using a total of 2–4 actuations of the appropriate product strength directed into alternate nostrils, according to weight.
<b>Context</b>	Emergency departments in eight UK hospitals.
<b>A priori themes (outcomes)</b>	
<b>Nonprocedural pain management practice</b>	Formal pharmacovigilance trial of a new intranasal diamorphine spray, Ayendi, used in children presenting to the emergency department with injuries requiring immediate pain relief.
<b>Results of the implemented pain management practice</b>	Although there are randomised and open- label studies to demonstrate the efficacy of IND use in children, IND has never been licensed as a medicinal product. Consequently, systematic evaluation of safety data of IND use in children are still lacking. There were no serious or severe adverse events amongst 226 children who received 0.1mg/kg intranasal diamorphine. The overall incidence of adverse events was 26.5%, 93% of which were mild. 20.4% of patients reported nasal irritation.
<b>Conclusion/recommendations</b>	Nasal diamorphine spray shows a good safety profile when used as an analgesic agent for acute moderate to severe pain in children presenting to the emergency department and has been subsequently licensed in the UK for acute severe pain in children.

## 6.2 Appendix B: Notification of Ethical Approval



Paul Ashley  
Eastman Dental  
InstituteUCL

Cc: Dakila Alkattan

03 May 2023

Dear Paul and Dakila,

### **Notification of Ethical Approval**

**Project ID/Title:** 23859/001 / Assessment of paediatric dentist views on non-proceduralpain assessment and non-procedural pain management: a qualitative study

I am pleased to confirm that your study has been ethically approved by the UCL Research Ethics Committee (UCL REC) until 30 November 2023.

Ethical approval is subject to the following conditions:

### **Amendments to Data Storage Plan**

It is highly recommended to delete audio recordings at the earliest possible opportunity following transcription.

Please note that consent forms being stored in a locked filing cabinet is not recommended. In the interest of security and ensuring compliance with UK data protection legislation, it is strongly recommended that research data is digitised and stored electronically on UCL systems rather than stored in hard copy. You can find more guidance on storage systems available to UCL researchers here: <https://library-guides.ucl.ac.uk/research-data-management/data-storage-ucl>

### **Notification of Amendments to the Research**

Please seek Chair's approval for proposed amendments (to include extensions to duration) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing an 'Amendment Approval Request Form' <https://www.ucl.ac.uk/research-ethics/responsibilities-after-approval>

### **Adverse Event Reporting – Serious and Non-Serious**

It is your responsibility to report to the REC any unanticipated problems or adverse events involving risks to participants or others. The REC should be notified of all serious adverse events via the Research Ethics Service - ([ethics@ucl.ac.uk](mailto:ethics@ucl.ac.uk)) immediately the incident occurs. Where the adverse incident is unexpected and

serious, the Joint Chairs will decide whether the study should be terminated pending the opinion of an independent expert.

For non-serious adverse events, the Joint Chairs should again be notified via the Research Ethics Service within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Joint Chairs will confirm that the incident is non-serious and report to the REC at the next meeting. The final view of the REC will be communicated to you.

### **Final Report**

At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes issues relating to the ethical implications of the research i.e., any issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc.

In addition, please:

- ensure that you follow all relevant guidance as laid out in [UCL's Code of Conduct for Research](#);
- note that you are required to adhere to all research data/records management and storage procedures agreed as part of your application. This will be expected even after completion of the study.

With best wishes for the research.  
Yours sincerely

**Professor Lynn Ang and Professor Michael Heinrich  
Co-Chairs, UCL Research Ethics Committee**

## 6.3 Appendix C: Participant Information Sheet

## **Assessment of paediatric dentist views on non-procedural pain assessment and non-procedural pain management: a qualitative study**

Non-procedural pain is defined as “the unpleasant sensory and emotional experience that arises from a health condition or an injury which is not associated with a diagnostic or treatment procedure”. To put it another way, it is the pain patients will feel as a result of their oral health condition. Examples could be pain from an exposed pulp or an abscess.

At present there is no set protocol for either measuring or managing this pain. Therefore the aim of this study is to evaluate how paediatric dentists manage non-procedural pain and recommend standardised practices in paediatric dentistry.

### **We invite you to take part in our research study**

- Before you decide to take part, it is important for you to understand why the research is being done and what it will involve.
- Please take time to read the following information carefully. Discuss it with colleagues and friends if you wish.
- You are free to decide whether or not to take part in this interview. If you choose not to take part this will not affect your job in any manner.
- This research study will be conducted as online voice only interviews at your preferred time.

### **Important things that you need to know**

We are trying to assess how paediatric dentist manage non-procedural pain. We want to better understand how paediatric dentist feel about the use of pain assessment tools to assess non-procedural pain.

The study will be carried out as an (audio only) online interview using a NHS approved platform. Before the interview, the researcher will confirm you whether you are willing to share your individual experiences and make sure you feel at ease. No personal information will be required for this study other than your approximate age.

This study will take up to 30-40 minutes of your time. You can request to stop taking part in the research at any time. Results of this study will form part of a research thesis which will be publicly available, this can be provided upon request.

The researcher will ask questions in the following topic areas

- Your perception on the importance of a baseline pain assessment prior dental treatment.
- How you carry out a non-procedural pain assessment and any barriers to this.
- How you decide on the appropriate management of non-procedural pain.
- Your perception on how well patients and parents are managing pain at home.
- Your perception on how patients are prioritised to receive treatment based on the pain management of choice.

### **What if there is a problem or I require further information?**

If you would like further information or you have concerns about this research at any time or you wish to withdraw you can:

- Discuss it with the investigator
- Email the Chief Investigator Professor Paul Ashley at [REDACTED]

However, if you remain unhappy or have a complaint about any aspect of this study and wish to speak to someone independent of the research team/hospital, please contact the Head of Research Governance and Compliance, UCL/UCLH Joint Research Office, University College London, Gower Street, London WC1E 6BT email: [research-incident@ucl.ac.uk](mailto:research-incident@ucl.ac.uk).

### **Privacy notice**

The controller for this project will be University College London (UCL). The UCL Data Protection Officer provides oversight of UCL activities involving the processing of personal data, and can be contacted at [data-protection@ucl.ac.uk](mailto:data-protection@ucl.ac.uk)

This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice:

For participants in health and care research studies, click [here](#)

The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices.

The lawful basis that will be used to process your personal data is: 'Public task' for personal data.

Your personal data will be processed so long as it is required for the research project. If we are able to anonymise or pseudonymise the personal data you provide we will undertake this, and will endeavour to minimise the processing of personal data wherever possible.

If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at [data-protection@ucl.ac.uk](mailto:data-protection@ucl.ac.uk)

## 6.4 Appendix D: NHS e-mail template

*Dear colleague,*

*We would like to invite you to take part in a voice only online interview entitled:*

*“Assessment of paediatric dentist views on non-procedural pain assessment and nonprocedural pain management: a qualitative study”. Ethics ID: 23859.001*

*This study will focus on the paediatric dentist’s perspective in managing dental pain before the actual dental procedure.*

*Please find the attached Participant Information Leaflet for further information on the study.*

*If you are interested in taking part or have any further queries, please reply to this email.*

*You are free to decide whether or not to take part in this interview. If you choose not to take part this will not affect your job in any manner.*

*Thank you.*

*Kind regards,*

*Dakila Alkattan*

*Year 3 Postgraduate*

*Paediatric Dentistry Department*

*Eastman Dental Hospital*

## 6.5 Appendix E: Consent Form

### CONSENT FORM FOR *PAEDIATRIC DENTISTS* IN RESEARCH STUDIES

**Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.**

**Title of Study:** Assessment of the paediatric dentist view on non-procedural pain assessment and non-procedural pain management: a qualitative study

**Department:** Paediatric Dentistry, Eastman Dental Institute.

**Name and Contact Details of the Researcher(s):**

Prof. Paul Ashley [REDACTED]

Prof. Susan Parekh [REDACTED]

Dakila Alkattan [REDACTED]

**Name and Contact Details of the Principal Researcher:** Prof. Paul Ashley  
[REDACTED]

**Name and Contact Details of the UCL Data Protection Officer:** [REDACTED]  
[REDACTED]

**This study has been approved by the UCL Research Ethics Committee: Project ID number: 23859/001**

Thank you for considering taking part in this research. The person organising the research must explain the project to you before you agree to take part. If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

**I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.**

		Tick Box
1.	*I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction  <i>[and would like to take part in an individual interview]</i>	
2.	*I consent to participate in the study. I understand that my personal information ( <i>age only</i> ) will be used for the purposes explained to me. I understand that	

	according to data protection legislation, ‘public task’ will be the lawful basis for processing.	
3.	<p><b>Use of the information for this project only</b></p> <p>*I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified.</p> <p>I understand that the data gathered from my voice recordings in this study will be stored securely. It will not be possible to identify me in any publications as only transcribed data will be included in publications and these data are not identifiable.</p>	
4.	*I understand that my information may be subject to review by responsible individuals from the University for monitoring and audit purposes.	
5.	*I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason up to a week after conducting the interview. I understand that if I decide to withdraw, any personal data I have provided up to that point will be deleted unless I agree otherwise.	
6.	I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
7.	I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.	
8.	I agree that my [pseudonymised] research data may be used by others for future research. [No one will be able to identify you when this data is shared.]	
9.	I understand that the information I have submitted will be published as a report and I wish to receive a copy of it. Yes/No	
10.	<p>I consent to my interview being audio recorded and understand that the recordings will be:</p> <ul style="list-style-type: none"> <li>- Stored using password-protected software and will be used for training, quality control, audit and specific research purposes.</li> </ul> <p>To note: If you do not want your participation recorded you can still take part in the study.</p>	

**If you would like your contact details to be retained so that you can be contacted in the future by UCL researchers who would like to invite you to participate in follow up studies to this project, or in future studies of a similar nature, please tick the appropriate box below.**

<input type="checkbox"/>	Yes, I would be happy to be contacted in this way	
<input type="checkbox"/>	No, I would not like to be contacted	

\_\_\_\_\_  
Name of participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Researcher

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature