Orofacial pain evaluation in children

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Abstract

Aim Pain evaluation in children and its diagnosis are problems not always easy to solve. Children, because of their immaturity, are not always able to well communicate or to describe the clear characteristics of the disease by which they are affected. Moreover, they are often unable to report the real intensity of the pain they experience. These problems are related to their immature, not fully evolved psyche. Such problems can create difficulties to the physician who is called to examine and evaluate the origin of orofacial pain, as well as hesitation regarding when it could be necessary to start a drug therapy. Aim of this work is to propose the basic tools for the evaluation and measurement of pain that are better suitable for children, as these instruments can be used together with an accurate anamnesis and a meticulous examination, in order to formulate a precise differential diagnosis among the pathologies that affect the head and neck. A list of the most common painful diseases affecting this area is also presented.

Methods A systematic literature review about the methods for evaluation and measurement of pain in children was conducted. The commonly used scales of measurement were examined: VAS, VSN, CAS, FPS and the Oucher SCALE. The different pathologies of head and neck and their characteristics are described and the possible causes of orofacial pain have been divided into extracranial and intracranial, in order to easily direct diagnosis.

Results Orofacial pain in children is an issue of great interest in consideration of its high frequency in paediatric dentistry. Its measurement and evaluation is possible despite the small compliance of paediatric patients. Thanks to the modern technique and knowledge this evaluation can be realistic and reproducible.

Conclusion Evaluation scales of pain are suitable at any age and skill of the child and, together with a careful anamnesis and a proper clinical examination, allow the clinician to conduct a precise differential diagnosis of the pain so as to set the ideal therapy for the little patient.

KEYWORD Children, Orofacial pain, Pain evaluation.

Introduction

Pain is a multifactorial and complex feeling strictly connected to the psychological status of the subject, and its perception and intensity can be influenced by the mental status. This is true for anybody but is more marked in children, who react to pain with a heavy load of anxiety and in very different ways due to their immature nervous system. It is important to remember that children are able to recognise the multidimensional character of pain very early. They can perceive nociceptive, sensorial and emotional components too (fear, anger, frustration, etc.) but they are often unable to isolate them as an adult can rationally do.

It is obvious that the level of comprehension of pain for children is strictly dependent on age, cognitive development, and communication skills. A proper evaluation of the signs simplify the identification of the aetiology and represent a key parameter in monitoring the evolution of a possible pathology, leading to a better management of pain.

The characteristics of pain such as location, quality, intensity, and duration are important clinical parameters, and their modification indicates changes in the progress of the pathology. From a statistical point of view the most represented cause of orofacial pain is related to odontogenic disease but the origin of a pain that manifests in the orofacial district may have many different causes. For this reason successful pain management in the facial region is the result of a proper diagnosis and a proper characterisation of the symptoms, i.e. careful anamnesis and clinical examination.

Methods: pain evaluation

The following characteristics of pain should be accurately examined.
- Location: ask the child to point with a finger where he/she feels pain. The operator has to understand if it is well-defined or diffused.
- Frequency and duration.
- Nature: intermittent or continuous, short or prolonged, acute or dull, pulsating or burning, spontaneous or caused, etc.
- Factors that mitigate or intensify pain.
- Order of appearance of the symptoms and their evolution.
- Intensity: in children it is hard to obtain realistic information about the real intensity of pain due to their limits in communication and the extreme variability in perception, which is influenced by behavioural, social and environmental factors. For these reasons, a heteroevaluation and a self-evaluation of the pain should always be performed. The former is made by medical professionals or parents and consists in observing child behaviours that are suggestive of the presence of pain (such as the Face, Legs, Activity, Crying, Consolability - FLACCS - scale). The latter can be made by the parents, by the healthcare provider (indirect approach) or by the patient (direct approach) using evaluation scales or pain scales. We report some well-known and utilised graphic scales for pain level evaluation.

The VAS (Visual Analog Scale) (Fig. 1) is represented with a horizontal line of 100 mm length with two extreme points of the two sides that indicate “no pain” (0 mm) and “worst pain ever” (100 mm), the scale is provided of a cursor that is moved along its length. The child moves the cursor in the point he/she believes corresponds to the level of pain perceived. The distance from the starting point (no pain) measured in mm corresponds to the pain score. Some authors consider this scale very advantageous for children 5 years and older [McGrath et al., 1996; Shields, 2003; Liebelt, 2000] due to its simplicity.

The VNS (Verbal Numeric Scale) (Fig. 2) is a linear scale very similar to the VAS in which the patient rates the pain simply choosing a score between 0 and 10 or from 0 to 100, where 0 corresponds to lack of pain and 10 or 100 to the highest pain imaginable. It works only with schoolchildren [Liebelt, 2000].

CAS (Coloured Analogue Scale) (Fig. 3) is designed as a rectangle with different colour shades. Colours change from green (no pain) to red (maximim pain) [Liebelt, 2000; McGrath et al., 1996].

The heterochromatic scale (Fig. 4) allows to define the intensity of pain trough the use of gradation of colors. The Facial Pain Scale (FPS) (Fig. 5) is an innovative non-verbal method used for children that have to chose among 6 different drawings, from a smiling face to a tearful face, that indicate different levels of pain: The child chooses the one that better identifies his/her perception of pain [Liebelt, 2000; McGrath et al., 1996; Hicks et al., 2001; Kaban and Troulis, 2004; Schiavenato, 2008].

The Oucher scale is made up by 6 different pictures of a child portraying different expression of ache. It is similar to the FPS and is also suitable for very young patients [Liebelt, 2000].

Useful to formulate a correct diagnosis of pain is also the McGill Pain Questionnaire (MPQ): it is not just a visual scale, here pain is analysed by asking questions to the little patient, and requires his/her interaction with the operator. It is made up of three parts in which the first includes a descriptive scale with numbers and adjectives qualifying the pain (1-tolerable; 2-unpleasant; 3-stressing; 4-tremendous; 5-unbearable); the second part consists of human figures in frontal and dorsal projections and the child indicates the localisation of pain; the third part gives an evaluation of pain based on a series of adjectives corresponding to the sensorial, affective and cognitive components of pain. The MPQ provides a great amount of information but it needs more time to be administered, and more child’s skills to be completed [Liebelt, 2000].

After investigating using these scales as efficient tools, the evaluation always needs to be completed by clinical examination that considers all the data obtained. We should always remember that a visit is essential for a correct diagnosis and to understand from where the orofacial pain derives in order to distinguish the origin of such a pain from those that have extracranial localisation to the intracranial ones.

**Extracranial disorders**

Extracranial disorders are the most common in clinical practice and mostly affect teeth.
Toothache
- Dentine ache: it is caused by the exposure of the dentine due to caries or enamel loss, as in dental fractures. It is an acute and deep pain, never spontaneous but always caused by food too cold or too hot, sweet, salty or sour, or by chemical or physical agents. Usually it is very short in duration and stops as soon as the stimulus is removed. It is often difficult to localise (Fig. 6) [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].
- Pulpal ache: it is spontaneous, intermittent, difficult to localise, it may be referred to the whole dental arch, to the antagonist arch or even to the contralateral one, to the ear or to the skin; pulsating or burning; it is perceived as a very severe pain that can exacerbate in few minutes. It increases with contact, pressure, changes of position, sweet or warm stimuli. It continues even after removal of the stimulus and it usually improves with cold. Clinically it is possible to identify dental caries as a cause. When pulp inflammation is not treated properly it can easily progress to an abscess; in these cases the purulent collection can drain across a fistula that can interest the skin leaving a permanent scar (Fig. 7) [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].
- Periodontal ache: it is easily located, pulsating, long lasting (hours), it does not worsen by cold or warm stimuli. Clinically it is possible to observe pain upon percussion, gingival erythema and tissue oedema [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].
- Acute apical periodontitis: it is characterised by spontaneous pain, intense, severe and prolonged. It arises following chewing or clenching so it is frequent when eating. It is well-localised and related to a tooth not vital anymore. It can be associated with facial swelling, fever and illness. Clinically, sensitivity is observed after stimulation (it can be a simple touch) of the involved tooth, hypersensitivity to warm and cold [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].
- Lateral periodontal abscess: the pain is well-localised, even if in this case the pain is associated with a vital tooth and the swelling is localised close to the gingiva. Clinically increased sensitivity upon percussion can be observed, to cold and warm stimuli, mobility and extrusion of the damaged tooth [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].
- Teeth fracture: it causes a short, acute, intermittent pain that arises with chewing, upon percussion and sometimes also with thermal stimuli (Fig. 8) [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].
- Pericoronitis: the pain is spontaneous, intensified by chewing. If it affects the third molar it can also cause ear- or headache [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].

Temporomandibular Joint Dysfunction
TMJ dysfunction is a frequent cause of pain of the head and neck district. It can be accompanied or not by joint sounds such as clicks and cracklings. What is always present is an inflammatory status of the joint, arthritis, or suffering of the linked muscles. With a clinical examination it is possible, when the disorder exists, to induce pain by palpation of the chewing muscles or the joint. The patient usually refers a pain localised at the ear, a degree of malocclusion and mandible deviation or limitation in mouth opening are often frequent. The pain is described as dull, not clearly localised, sometimes pulsing, intermittent, unilateral that arises with chewing and it is sometimes associated with lockjaw [Marci et al., 1998; De Michelis and Modica, 1998; Gasparetto et al., 1994].

Salivary gland disorders
- Bacterial sialoadenitis: it mostly involves the parotid gland. It begins as gland swelling and eventually pus may flow out the Stensen’s duct. The pain is spontaneous and caused by pressure above the duct or can rise concurrently with chewing, presenting itself as a salivary colic.
- Epidemic parotitis: it causes fever, illness, oral dryness and simultaneous bulging of the parotid gland accompanied by pain, discomfort when swallowing and skin may appear tight and thin [McGrath et al., 1996].
- Sialolithiasis: symptoms include sudden pain and bulging of the affected gland, especially during chewing.

Sinusitis
Sinusitis is characterised by pain and sensitivity in the region of the paranasal sinuses that can change intensity with body movements. Sweening is usually not present [Kaban and Troulis, 2001; Gasparetto et al., 1994]. Pressure on the point where the trigeminal nerve branches emerge always causes pain.

Otitis
External otitis cause itch and pain that arise from chewing, from traction of the auricle or from pressure above the tragus. If the inflammation affects the middle ear it can cause pain and nasal obstruction; it is accompanied by Eustachian tube dysfunction and respiratory infection [Kaban and Troulis, 2001].

Eye disorders
An optic neuritis can cause pain during eye movement. Another cause of sudden pain is glaucoma [Kaban and Troulis, 2001].
Intracranial disorders

When visiting a little patient suffering for a pain that involves the craniofacial district it is necessary to consider some disorders that for convenience we identify as intracranial. These conditions are often represented by disease that are not treated by the dentist or the maxillofacial surgeon, but these specialists are generally the first healthcare professionals who detect these kind of disorders, therefore they should understand that it could be a problem and address the patient to the proper specialist.

Systemic diseases
- Multiple sclerosis: this pathology often starts with neuralgia, facial muscle paralysis, tremor facial muscles, retro-orbital pain that is worsened by eye movements [Kaban and Troulis, 2001].
- Juvenile miastenia gravis: it is characterised by asthenia that involves all facial muscles, ophthalmoplegia, dysphagia and palpebral ptosis [Kaban and Troulis, 2001].
- Fibromyalgia: there are signs of fatigue and generalised pain that worsens with function [Kaban and Troulis, 2001].

Neuralgias
- Trigeminal: the patient reports a kind of pain similar to an electric shock, sharp, stinging, sudden or occasional with few remissions [Kaban and Troulis, 2001; Gasparetto et al., 1994; Micheli et al., 2001].
- Postherpetic neuralgia: there is a constant burning sensation with waves of stubbing pain. Pain is recurrent, persistent, worsened by the touch or movement. However it is rare in children [Kaban and Troulis, 2001; Gasparetto et al., 1994; Micheli et al., 2001].
- Atypical facial pain: scorching, generalised, incessant, cramp-like, similar to an electric shock [Kaban and Troulis, 2001; Gasparetto et al., 1994; Micheli et al., 2001].

Headache
- Common headache: pain episodes are repeated, unilateral, pulsating, prolonged, of moderate to high intensity. Usually we find also nausea, vomit, photophobia, abdominal cramps and paleness. Pain is worsened by physical effort [Kaban and Troulis, 2001; Gasparetto et al., 1994; Qureshi and Lewis, 2003].
- Tension headache: it is a recurrent headache that produces an acute pain with gradual onset and regular increase, localised at the nape, the neck and head. The pain is not associated with nausea and vomit. Photophobia or phonophobia can be present [Kaban and Troulis, 2001; Gasparetto et al., 1994; Qureshi and Lewis, 2003].
- Cronic progressive headache: it is caused by increased intracranial pressure due to tumours, hydrocephalus, vascular malformation, subdural haematoma, etc. The pain attacks rise in intensity and frequency and are associated with neurologic symptoms characteristic of the augmented pressure in the cranium [Kaban and Troulis, 2001; Gasparetto et al., 1994; Qureshi and Lewis, 2003].
- Cronic non progressive headache: atypical example is post-traumatic headache associated with dizziness and nausea [Kaban and Troulis, 2001; Gasparetto et al., 1994; Qureshi and Lewis, 2003].

Conclusion

In order to properly threat pain in children, as well as in adults, an adequate definition of the pain itself is necessary to allow the physician to perform a focused and effective treatment. Unfortunately in our daily routine it is not always easy to understand the little patient because of communication, intellective or linguistic problems and the high variability of children feelings. A useful aid is represented by the evaluation scales of pain that are suitable at any age and skill of the child. These scales, together with a careful anamnesis and a proper clinical examination, allow the clinician to conduct a precise differential diagnosis of the pain so as to set the best and adequate therapy for the little patient.

References
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