NEUROPATHIC OROFACIAL PAIN : A REVIEW AND GUIDELINES FOR DIAGNOSIS AND MANAGEMENT

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Abstract

Neuropathic pain is defined as “pain initiated or caused by a primary lesion or dysfunction in the nervous system”. In contrast to physiological pain that warns of noxious stimuli likely to result in tissue damage, neuropathic pain serves no protective function. Examples of neuropathic pain states include postherpetic neuralgia (shingles) and phantom limb / stump pain. This pain state also exists in the orofacial region, with the possibility of several variants including atypical odontalgia and burning mouth syndrome. There is a paucity of information on the prevalence of neuropathic pain in the orofacial region. One study assessed patients following endodontic treatment and found that approximately 3 to 6% of patients reported persistent pain. Patients predisposed to the condition atypical odontalgia (phantom tooth pain) include those suffering from recurrent cluster or migraine headaches.

Biochemical and neurobiological processes leading to a neuropathic pain state are complex and involve peripheral sensitisation, and neuronal plasticity of the central and peripheral nervous systems. Subsequent associated pathophysiology includes regional muscle spasm, sympathetic hyperfunction, and centralisation of pain. The relevant clinical features of neuropathic pain are: (i) precipitating factors such as trauma or disease (infection), (ii) pain that is frequently described as having burning, paroxysmal, and lancinating or sharp qualities, and (iii) physical examination may indicate hyperalgesia, allodynia and sympathetic hyperfunction. The typical patient complains of persistent, severe pain, yet there are no clearly identifiable clinical or radiographic abnormalities. Often, due to the chronicity of the problem, afflicted patients exhibit significant distress and are poor pain

historians, thus complicating the clinician's task of obtaining a detailed and relevant clinical and psychosocial history.

An appropriate analgetic blockade test for intraoral sites of neuropathic pain is mucosal application of topical anaesthetics. Other, more specific, tests include placebo controlled lignocaine infusions for assessing neuropathic pain, and placebo controlled phentolamine infusions for sympathetically maintained pain. The treatment and management of neuropathic pain is multidisciplinary. Medication rationalisation utilises first-line antineuropathic drugs including tricyclic antidepressants, and possibly an anticonvulsant. Topical applications of capsaicin to the gingivae and oral mucosa are a simple and effective treatment. Neuropathic pain responds poorly to opioid medication. Psychological assessment is often crucial in developing strategies for pain management. Psychological variables include distress, depression, expectations of treatment, motivation to improve, and background environmental factors.

To enable a greater understanding of neuropathic pain, thereby leading to improved treatments, high-performance liquid chromatography-mass spectrometry is one analytical technique that has the potential to contribute to our knowledge base. This technique allows drugs and endogenous substances to be assayed from one sample in a relatively short time. The technique can identify, confirm, and measure the concentrations of multiple analytes from a single sample.

Publications arising from this thesis

Vickers ER, Cousins M. Neuropathic orofacial pain. Part 1: Prevalence and pathophysiology. Australian Endodontic Journal 2000; 26: 19-26.

Vickers ER, Cousins M. Neuropathic orofacial pain. Part 2: Diagnostic procedures, treatment guidelines and case reports. Australian Endodontic Journal 2000; 26: 53-63.

Vickers ER, Cousins M, Nicholas M. Facial pain: a biopsychosocial problem. Medicine Today 2000; 11: 42-8.

Vickers ER, Harris RD. Neuropathic pain as a complication of maxillofacial injury and surgery. Middle East Journal of Oral and Maxillofacial Surgery (in press).

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Abbreviations

AO	atypical odontalgia
CNS	central nervous system
CRPS	complex regional pain syndrome
CT	computerised tomography
Cyclic-AMP	cyclic-adenosine monophosphate
EMLA	eutectic mixture of local anaesthetics
GABA	gamma-aminobutyric acid
GC-MS	gas chromatography-mass spectrometry
HPLC (LC)	high-performance liquid chromatography
IASP	International Association for the Study of Pain
LC-MS	high-performance liquid chromatography coupled to mass spectrometry
MPQ	McGill Pain Questionnaire
MRI	magnetic resonance imaging
MW	molecular weight
NMDA	n-methyl-d-aspartate
NSAIDS	nonsteroidal antiinflammatory drugs
OPG	orthopantomogram
PMRC	Pain Management and Research Centre
PNS	peripheral nervous system
PRI(A)	pain rating index (affective)
PRI(E)	pain rating index (evaluative)
PRI(M)	pain rating index (miscellaneous)
PRI(S)	pain rating index (sensory)
PRI(T)	pain rating index (total)
RCT	root canal therapy
SD	standard deviation
SIP	sympathetically independent pain
SMP	sympathetically maintained pain
TCA	tricyclic antidepressant
TMD	temporomandibular disorder
VAS	visual analogue scale

Glossary of Terms*

after discharge	continued firing of dorsal horn neurons following repetitive peripheral stimulation
algesic	pain producing
algogen	pain producing substance
algogenic	pain producing
allodynia	pain from stimulus that does not normally cause pain
analgetic	pain relieving, analgesic
atypical facial pain**	a diagnosis characterised by vague signs and symptoms with significant psychological factors
atypical odontalgia	severe, throbbing pain without major pathology, phantom tooth pain
central sensitisation	a phenomenon occurring in the dorsal horn and other central structures causing allodynia and secondary hyperalgesia in uninjured tissue surrounding a site of injury
complex regional pain syndrome (CRPS) type I	a syndrome that usually develops after an initiating noxious event, is not limited to the distribution of a single peripheral nerve, and is apparently disproportionate to the inciting event
complex regional pain syndrome type II	burning pain, allodynia and hyperpathia usually in the hand or foot, after partial injury to a nerve or one of its major branches
homeopathy (US) / homoeopathy (UK)	a traditional system of diagnosing and treating ailments
hyperalgesia	increased response to a painful stimulus

* Definitions from the International Association for the Study of Pain (IASP), 1994.
** Definition from the IASP, 1986. Term discontinued in 1994.

neuropraxis	crush injury to a nerve
neurotmesis	sectioning or cutting of a nerve
nociception	activation of peripheral nociceptor which is recognised centrally as pain
peripheral sensitisation	a phenomenon where inflammatory mediators sensitise high threshold nociceptors
physiological pain	pain that serves a protective function (as a warning for tissue damage), is transient and well localised
sympathetic hyperfunction	characterised by changes in skin temperature, blood flow, resting sweat output and presence of oedema
sympathetically maintained pain	defined as pain that is maintained by sympathetic efferent innervation or circulating catecholamines
windup	progressive increase in response of dorsal horn neurons due to repetitive peripheral stimulation