

## Case studies illustrating the management of trigeminal neuropathic pain using topical 5% lidocaine plasters

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### Abstract

Chronic trigeminal pain, with its severe related functional problems, is difficult to treat. Treatment is often empirically based on medications used for other chronic pain conditions. Systemic sodium channel and calcium channel blocking agents may cause a multitude of complications that are often poorly tolerated by the patient.

**Aim:** The aim of this case report was to assess the efficacy of topical 5% lidocaine plasters in reducing pain and reducing adjuvant medication in patients with orofacial neuropathic pain.

**Method:** Fourteen patients with chronic orofacial pain conditions referred to the oral surgery department were instructed to wear 5% lidocaine plasters for 12 hours each day over the painful area. The conditions included post-surgical neuropathy ( $n = 10$ ), multiple sclerosis-related pain ( $n = 1$ ), persistent idiopathic facial pain ( $n = 1$ ), Ramsay Hunt syndrome (post-herpetic neuralgia,  $n = 1$ ) and trigeminal neuralgia ( $n = 1$ ). Data were collected on patient demographics, pain levels and medication.

**Results:** Pain levels improved in 12 out of 14 patients. Nine patients had a reduction in adjuvant medication, two of whom completely stopped adjuvant treatment.

**Conclusion:** This case series demonstrates that the use of 5% lidocaine plasters may play a useful role in the management of chronic trigeminal pain. A suggested novel approach for the management of orofacial pain, for clinicians, is presented.

### Summary points

1. Management of chronic orofacial pain continues to be a major challenge to the clinician.
2. Patients are often placed on a multitude of medications in an attempt to alleviate pain without success.
3. Topical 5% lidocaine plasters, currently used for the management of post-herpetic neuralgia, offer the option of locally targeting trigeminal pain without the multiple side-effects of systemic medication.
4. This case series demonstrates that lidocaine plasters decrease verbal pain scores in extraoral, trigeminal and neuropathic pain, and reduce the use of other neuromodulatory agents in some, but not all, patients.
5. The plasters should be considered as a useful adjuvant in the management of pain in these patients.

- [Chronic](#)

- [lidocaine](#)

- [neuropathic](#)

- [pain](#)

- [topical](#)

- [trigeminal](#)

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## Introduction

Chronic orofacial pain is comparable with other pain conditions in the body, accounting for between 20% and 25% of chronic pain conditions.<sup>1</sup> A recent cluster analysis classifying orofacial pain identifies neuralgia as an individual pain group incorporating not only the more commonly acknowledged conditions such as trigeminal and post-herpetic neuralgia, but also post-traumatic neuralgia ([Table 1](#)).<sup>2</sup> Sensory nerve injury in post-traumatic neuralgia often results not only in numbness, which is a common misapprehension, but also in altered sensation and or pain ([Table 2](#)).

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**Table 1.**

Classification of chronic orofacial pain based on cluster analysis<sup>2</sup>

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**Table 2.**

Definitions of neuropathic pain types (International Association for the Study of Pain, 2007).

The impact of trigeminal pain is often underestimated, commonly interfering with speech, eating, kissing, make-up application, shaving and drinking; in fact, just about every social interaction we take for granted.<sup>3</sup>

Currently there is limited evidence-based management for chronic orofacial pain conditions. Carbamazepine is suggested for first-line medical management of trigeminal neuralgia (oxycarbamazepine for intolerant individuals)<sup>4</sup> and conservative, reversible treatment is recommended initially for the treatment of temporomandibular joint disorder.<sup>5</sup> Surgical interventions are effective in only some patients, and hence treatment is often empirically based on medications used for other chronic pain conditions, such as antidepressants or antiepileptics.<sup>4,6</sup> Other conditions, including persistent idiopathic facial pain and post-surgical neuropathy, do not have recommended evidence-based care, but symptoms are also similarly medically managed.<sup>7</sup> Such systemic medications may cause a multitude of complications and are often poorly tolerated by patients.<sup>8</sup> A topical approach to treating patients with chronic neuropathic orofacial pain may be more useful for such cases, especially in the avoidance of side-effects.

Lidocaine is a well-known local anaesthetic, sodium channel-blocking agent, regularly administered intraorally by dental clinicians. The 5% lidocaine plaster (Versatis®, Grünenthal UK Ltd, Stokenchurch, UK) is made of an adhesive material containing 700 mg lidocaine, which is applied to a polyethylene terephthalate backing.<sup>9</sup> Currently these plasters are licensed, in the UK, solely for the management of localised post-herpetic neuralgia. The plasters are designed to be placed over the affected painful area, on intact skin, for a continuous 12-hour period each day and then must be removed for at least 12 hours. Continued pain relief during the day can be obtained through night-time application. The

plaster itself may also have some limited protective properties against mechanical stimulation of the skin (e.g. cold wind or bed sheets) in patients suffering from allodynia. The plasters (10 × 14 cm) can be cut into smaller sizes to fit the chin and lip and extra-adhesive tape or plaster ([Figure 1](#)) can be placed over the patch for reinforcement.<sup>9</sup>



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**Figure 1.**

Photograph demonstrating how to wear the plaster on the face (a) and covered with foundation make-up (b).

As with other local anaesthetics, the lidocaine patch results in sodium channel blockade inhibiting nerve conduction and stabilising neuronal membranes. This results in dampening of both peripheral nociceptor sensitisation and, ultimately, central nervous system hyperexcitability. Importantly, the lidocaine can penetrate the skin enough to result in an analgesic effect, but the amount is insufficient to produce a complete sensory block (i.e. numbness).<sup>10</sup>

Plasma levels of lidocaine remain insignificant (45 ng/mL after application of three plasters simultaneously in patients with post-herpetic neuralgia,<sup>11</sup> even with chronic use, thus eliminating systemic side-effects<sup>12</sup> and toxicity. The most common reported adverse reaction is skin irritation resulting in blisters, erythema and oedema, which tends to resolve spontaneously within a few minutes to a few hours.<sup>12</sup> Studies have suggested that the lidocaine patch may be effective for chronic neuropathic pain conditions other than post-herpetic neuralgia, including painful diabetic neuropathy and low back pain.<sup>10</sup> Recently, its use in managing neuropathic pain associated with inferior alveolar nerve injury has been reported.<sup>13</sup> The study reported success in one-quarter of patients when using the plasters alone but one-quarter stopped treatment with the plasters after they developed a rash.

In 2002, Katz et al. presented results from a prospective trial, at the American Pain Society's 20th Annual Scientific Meeting, demonstrating that the 5% lidocaine patch improved pain scores in treated patients with trigeminal post-herpetic neuralgia.<sup>14</sup> To date, there are no other published trials on the effectiveness of lidocaine plasters in managing atraumatic chronic orofacial neuropathic pain. In this report, we present a case series aiming to assess whether the use of topical 5% lidocaine plasters reduces the level of pain and the use of adjuvant medication in patients with orofacial neuropathic pain.

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## Methods

Over a twelve month period (2008–2009) patients referred to the oral surgery department with extra-oral neuropathic trigeminal pain ([Table 3](#)) were treated with 5% lidocaine plasters (Versatis®).

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**Table 3.**

Data of collected cases.<sup>16</sup>

At initial consultation, a thorough pain, medical and drug history was taken and a thorough physical examination performed. The same clinician assessed all the patients in this cohort. Standardised neurosensory tests were carried out including light touch, sharp–blunt discrimination, two-point discrimination and subjective function.<sup>15</sup> Mechanical and cold stimuli were evoked by gently touching the neuropathic area with a dental probe and a piece of cotton wool sprayed with ethyl chloride,

respectively. Patients were asked to verbally report their pain on a scale ranging from 0 to 10 (where 0 represents no pain and 10 represents the worst pain imaginable) and explain how the condition affects them functionally on a day-to-day basis. Patients were instructed to wear one plaster over the affected site ([Figure 1](#)) for a continuous 12-hour period each day, preferably at night. There was no alteration to the patients' other medication and they were advised that the plasters would not interfere with their normal medication regimen.

Patients were reviewed following continuous use of the medicated plasters for a minimum of 4 weeks. Another verbal pain report assessment was attained along with an explanation of any change in daily function and symptoms. The patients' medication use was again recorded at review to ascertain if a change in adjuvant medication had occurred as a result of treatment with topical lidocaine plasters. Patients' general comments were also sought at review to clarify if any problems arose using these plasters.

Pain scores prior to and after the use of the plasters were compared using the Student's *t*-test for analysis of the means, at a 95% confidence interval ( $p < 0.05$ ).

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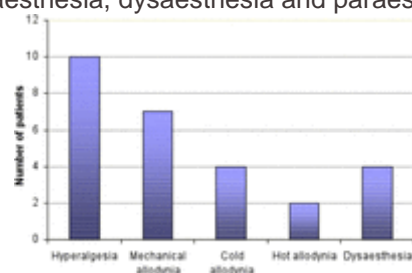
## Results

Fourteen patients were referred to the oral surgery department in a 12-month period ([Table 3](#)). The pain conditions involved the mandibular division of the trigeminal nerve (V3); post-surgical neuropathy affecting the inferior alveolar nerve (IAN) dermatome ( $n = 10$ ), Ramsay Hunt syndrome (post-herpetic neuralgia;  $n = 1$ ), trigeminal neuralgia ( $n = 1$ ), multiple sclerosis ( $n = 1$ ) and the maxillary division of the trigeminal nerve (V2) in the form of persistent idiopathic facial pain ( $n = 1$ ).

The largest group in this cohort was those with post-surgical neuropathic pain in relation to dental procedures. Thirty per cent of the dental procedures causing IAN injury were wisdom tooth removal or implant therapy. Endodontic therapy, extracted lower premolars and surgical removal of a mucocele accounted for the remaining surgical causes. All pain conditions in this cohort affected extraoral sites of the maxillary and mandibular divisions of the trigeminal system only.

The mean age was 59 years old (range 27–82 years) with a male to female ratio of 1:6. Duration of symptoms on initial presentation to the oral surgery department ranged from 1 to 9 months.

The majority of patients suffered from more than one type of alerted sensation. Most of them demonstrated hyperalgesia on sensory testing ([Figure 2](#)). All patients reported associated functional problems, with half of patients reporting difficulties with sleeping and eating ([Figure 3](#)). Other functional problems included drinking, kissing, make-up application, going outside and shaving. The functional problems were entirely attributable to elicited or ongoing pain in or around the orofacial region. The types of pain reported by the patients were spontaneous, evoked or constant pain, demonstrating features of hyperaesthesia, dysaesthesia and paraesthesia.

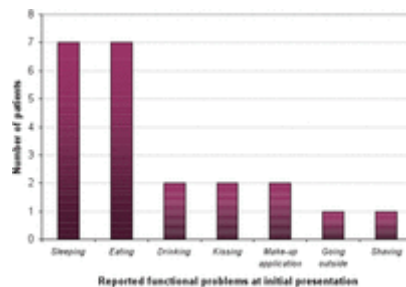


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**Figure 2.**

The proportion of reported symptoms at initial presentation.



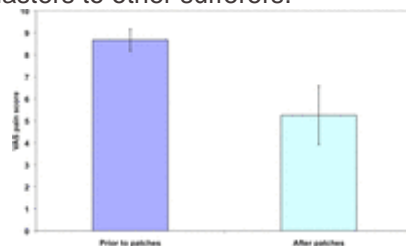
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**Figure 3.**

The proportion of reported functional problems at initial presentation.

Twelve out of fourteen patients responded to topical lidocaine plasters. There was a reduction in the level of ongoing pain from 9.8 (range 7–10) to 4.7 (3.5–10) after using the topical 5% lidocaine plasters ( $p < 0.05$ ; 95% CI) (Figure 4). Eleven patients showed a reduction in pain ( $\geq 2$  points) on the verbal rating scale following use of the plasters.<sup>17</sup> Nine out of the twelve patients who responded to lidocaine plasters also reported a reduction in the use of adjuvant therapies, including anticonvulsants and tricyclic antidepressants, two of whom completely stopped adjuvant therapy. Nine out of fourteen patients would recommend the plasters to other sufferers.



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**Figure 4.**

Visual analogue scale (VAS) pain scores before and after patches.

Topical lidocaine treatment was unsuccessful in two patients: one patient did not feel any pain relief and the other reported a localised rash in the area covered by the plaster. The rash spontaneously resolved following removal of the plaster. This was the only reported side-effect.

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## Discussion

This is the first case series to demonstrate that topical 5% lidocaine plasters may be used as an adjunct in the management of patients with chronic trigeminal neuropathic pain of both traumatic and atraumatic nature. Multiple studies have demonstrated the efficacy of 5% lidocaine plasters in the management of post-herpetic neuralgia, and hence has been recommended as its first-line therapy.<sup>18</sup> However, there are relatively few reports using topical lidocaine plasters for other chronic pain conditions, including trigeminal pain.<sup>10</sup>

A recent study demonstrated a significant reduction in three chronic pain conditions following use of the 5% lidocaine patch: post-herpetic neuralgia, painful diabetic neuropathy and low back pain.<sup>17</sup> In addition, a reduction in brain activity following a 2-week treatment of lidocaine plasters in chronic low back pain (medial prefrontal cortex) and knee osteoarthritis (thalamus) patients has been reported using serial functional magnetic resonance imaging.<sup>19</sup> This suggests that chronic pain conditions that

demonstrate common neuropathic symptomatology with post-herpetic neuralgia may be successfully managed using the lidocaine plaster.

Neuropathic pain often responds poorly to conventional analgesics (e.g. non-steroidal anti-inflammatory drugs, paracetamol, opioid analgesics). Their effect is potentiated when they are used in combination with antidepressants and anticonvulsant medications. Other topical preparations often rely on absorbance of the analgesic to exert a systemic effect (e.g. fentanyl plasters), and hence not reducing potential associated side-effects. National Institute for Health and Clinical Excellence guidelines, issued in March 2009, recommend amitriptyline [number needed to treat (NNT) = 3.6] or pregabalin (NNT = 4–11, depending on dose) as first-line therapy treatment options for adults with neuropathic pain,<sup>16</sup> giving prescription guidance to practitioners. Topical capsaicin cream has been reported to be effective in some neuropathic pain conditions, but comes with the unpleasant side-effect of an initial stinging sensation.<sup>20</sup>

This patient cohort presented with moderate to severe pain affecting extraoral sites of maxillary or mandibular divisions of the trigeminal nerve. This often has high functional implications given the affected site. The functional disability associated with trigeminal pain is rarely reported<sup>21</sup> and requires better scrutiny. Alarming, the majority of this patient cohort had severe neuropathic pain associated with post-surgical neuropathy. Predominantly, the surgical cause of neuropathic pain was either removal of wisdom teeth or implant placement. The iatrogenesis of post-traumatic neuralgia also compounds the negative psychological effects for these injuries,<sup>22</sup> heavily impacting the patient's ability to cope with chronic pain.

Pain levels were reduced using 5% lidocaine plasters for trigeminal pain as previously reported in other pain conditions, highlighting that this treatment method may be a useful adjunctive tool for the management of chronic orofacial pain. The reduction in pain levels may be related to the moderate/severe level of pain reported by these patients. It remains unknown if this treatment would be as effective in a patient group with low/moderate pain levels.

Most patients were happy wearing the plasters, however, many patients commented on the difficulty of maintaining adhesion of the plasters with micropore tape. There was a single adverse event of rash formation. Most patients reported that these minor issues were outweighed by the benefits of use. Interestingly, several patients commented that the plasters significantly assisted with breakthrough pain, particularly to cold allodynia caused by exposure of the face to cold air resulting in excruciating pain. As these plasters are adhesive, they are not applicable to intraoral sites and are limited to extraoral use only.

The successful use of lidocaine plasters in controlling chronic neuropathic pain in clinical practice was demonstrated by a multicentre study that reported a 30% reduction in overall pain intensity within the first 2–3 weeks with continuous further reductions until end of observation at 12 weeks.<sup>23</sup> The duration of use of the topical lidocaine plasters in this study ranged from 4 to 19 weeks. Further attenuation of the patient to this modality of treatment may be possible and worthy of determination. Further use in more localised pain conditions such as persistent dentoalveolar pain (PDAP, atypical odontalgia) may also be possible.

Treatment with lidocaine plasters have been demonstrated not only to reduce the pain experience but also to improve anxiety and depression scores and overall quality of life scores.<sup>23</sup>

It is worth remembering that neuropathic pain is not entirely dependent on peripheral afferent input but may also be as a result of central sensitisation and plasticity. This indicates that the sole use of lidocaine plasters may be insufficient to render patients completely pain free. If, however, they are used in combination with adjunctive systemic medication (e.g. pregabalin) they can help control pain and limit side-effects by lowering the effective dose of the systemic medication. Reduction of adjuvant pain medication was observed in nine patients, two of whom managed to stop their multidrug regimen entirely.

It may be suggested that early use of lidocaine plasters can help limit peripheral nerve excitation, preventing central sensitisation and improving successful pain management.

The limitations associated with this case report are acknowledged, including the small sample size and heterogeneous nature of the sample (surgical and non-surgical neuropathy). Further work will assess whether patients experience continued modulation of neuropathy after long-term use.

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## Conclusion

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Management of chronic orofacial pain remains a significant challenge. Owing to the common and unacceptable levels of side-effects from antidepressant or anticonvulsant drugs, many patients find adhering to therapy extremely difficult, further compromising their pain management. Five per cent lidocaine plasters have been shown to be a useful adjunct in the treatment of orofacial pain and most patients found them acceptable. These recommendations are preliminary in nature and further studies are needed to assess the efficacy of topical 5% lidocaine plasters in a larger cohort of patients (randomised, double-blind, placebo-controlled trials).

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## Article Notes

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