**Reducing the frequency of pre-treatment re-call visits for oro-dental lesions in the clinic with application of Closed-Mouth technique of the mandibular nerve block.**

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 **Abstract**:

The Closed Mouth Technique (CMT) of the mandibular nerve block is currently under-applied in

the management of patients by many clinicians in their practice. This trend adversely affect the

scope of patients’ burdens they perform in their clinics on daily basis. The CMT has been found

useful in managing a wide scope of lesions in the clinics, resulting to satisfaction to both

patients and operators. This method achieves effective anaesthesia even when other types of

mandibular nerve block techniques fail because poor mouth opening is not a contra-indication,

and its point of delivery on the nerve trunk is high, and this makes diffusion of anaesthetic into

the relevant branches of the mandibular nerve.

Patients in this study included those with oro-dental lesions that could not be anaesthesize with

methods that require adequate mouth opening, patients with complications from previously

attempted or failed local anaesthesia. Alcoholics and patients that could be succesfully

anaesthesized with other methods were not included. The study was over a 5 year period.

Three hundred and forty (340) patients were treated based on the inclusion criteria in the

study. The lesions which the patients presented with included, pericoronitis 114 (30%), benign

tumours 12 (12.11%) including vasoformative growths, failed pulp treatment and periapical

abscess 137 (36.05^), periodontitis and submandibular abscess 32 (10%), mandibular fractures

and soft tissue injuries 45 (11.84%). Treatments were either or combination of conservative and

invasive therapy.

The technique of the mandibbular nerve block offered effective and adequate anaesthesia for a

variety of oro-dental lesions which the other techniques that require adequate mouth opening

could not achieve in our practice.

**INTRODUCTION**:

Many studies show that muskulo-skeletal pathology and anatomical variations are significant

contributory factors for local anaesthetic failures in patients seeking treatments for oro-dental

lesions1,2,3. Poor mouth opening as one of the consequences of pathology makes visualization

of the landmarks for the administration of many mandibular blocks including inferior alveolar

(conventional) Gow-Gates nerve block difficult4. Added to this clinical challenge witnessed in

poor mouth opening are the issues of altered anatomy in the mandible and the nerve. These

include bifid mandibular foramen, bifid inferior alveolar nerves and supplemental supplies from

unusual nerves such as cervical nerves from the cervical plexus3,4,5.

The mandibular nerve block anaesthetic techniques commonly considered by clinicians are the

Inferior Alveolar (conventional), Gow-Gates, and the closed- mouth technique(s). The Inferior

alveolar and the Gow-Gates nerve blocks require adequate mouth opening for successful

injections, but this is does not happen in the case of CMT. Nevertheless, the essential

commonality among the three block methods is that the pterygomandibular space serves as an

anatomical chamber where the anaesthetic solution is injected for induction of anaesthesia

through the nerve. However, the depositions are at different vertical levels or positions on the

nerve trunk. These different levels at which the anaesthetic is deposited regarding the different

techniques play a significant functional role in achieving and offering different fields and depth

of local anaesthesia on the mandibular tissues.. The CMT appears to be the sine qua non in

achieving local anesthesia of tissues that are innervated by the third branch of the trigeminal

nerve especially when the challenge of adequate mouth opening is prevalent.

The difficulty in opening the mouth adquately is attributed to trismus in the muscles that

participate in the mechanism of mouth opening. These muscles include the lateral pterygoids,

digastrics, geniohyoids and mylohyoids. Also contractions of the other group of muscles that

function in closing the mouth can cause similar condition (compromised opening). In clinical

practice, despite these challenges, certain procedures need be done as a matter of expediency

without necessarily resorting to general anesthesia, or embarking on delays for the treatments

by giving patients more appointments (re-call visits). Multiple visits where less visits are

possible is associated with disappointment, obvious clinical discomfort, adverse economic

impact and unfavourable social effects on thepatients.

 In overcoming these challenges in our practice, we resorted to the Closed-Mouth Technique

(CMT) which in addition to obviating the stated short comings in delays, offered profound

anaesthesia for our procedures4,6,7.

In this paper, we highlight the variety of oral lesions we managed with the application of the

Technique.

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**Patients  and Method:**

This is a prospective study of patients that we managed in our clinics within a 5 year period with

the application of the Closed-Mouth Technique (CMT) of the mandibular nerve block. The

patients included those whose clinical conditions could not be treated with the other block

techniques that require sufficient mouth opening. Also included were patients that presented

to us but had unsuccessful treatments at other centre(s) where they had tried to source

treatments. These comprised of patients whose treatment failures were as a result of failed

anaesthesia rather than poor or faulty operative technique. Excluded were patients that could

possibly be treated with other mandibular block methods. Also excluded were established

alcoholics or on strong alcohol within the previous 24 hours, and those with infections /

inflammations such as ulcers on the medial surface of the ramus or adjacent to the

maxillary tuberosity at possible entry sites of needle for injections were also excluded.

Three hundred and forty (340) patients met the inclusion critera.

All the patients were covered with broad spectrum antibiotics, including anti-anaerobics at pre-

peri- and post-operatives. The diabetics among them were continued on their relevant

antibiotic regimens based on the accompanying microbiology laboratory results, as well as

ensuring that their blood glucose levels were stable with their anti-diabetic drugs.

The clinical procedures were covered by our institutions ethical guide lines and policies on

patients’ management.

In performing the procedures, our armamenterium comprised of, surgical tray, soft tissue

retractor, pre-loaded aspirating dental syringe with long dental needle, 1.8 millilitre of 2%

lignocaine cartridge, 4% topical lignocaine and cotton wools. The injection is delivered while the

upper and lower teeth are closed together. The oral cavity was prepared with oral antiseptic

mouth gaggle. We then visualised and palpated the maxillary tuberosity, second and third

molar teeth, and the mucogingival junction of the buccal mucosa of the maxillary dentition as

anatomical land marks.The soft tissue retractor was used to retract the lip and cheek tissues at

this stage. This was then followed by application of topical anaesthetic at site of needle

penetration.

The patient was made to sit comfortably in a semi-reclining position with the occluasal surface

of the closed teeth lying parallel to the floor. With the other non-operating hand, the upper lip

and soft tissues of the cheek were retracted laterally away from obstruction. The pre-loaded

aspirating syringe with long dental needle is used to inject the anaesthetic nto the target in the

pterygomandibular space.

The point of needle penetration is at a parallel line to the mucogingival junction of the maxillary

mucosa, precisely superior and posterior to the maxillary third molar, at the maxillary

tuberosity. The needle is moved posteriorly and tangential to the maxillary process but

consciously towards the ramus, and when the hub of the needle lied beside the second molar

tooth, the solution was slowly injected into the pterygomandibular space. At this point, the

needle is in the ptreygomandibular space without contact with bone and at point high enough

to anaesthesise all the targeted mandibular nerve branches and their terminal branches,

including the lingual, nerve to mylohyoid and the buccal nerves.

Patient’s response to subjective testing was always positive in less than 90 seconds with report

of feeling numb in the target-tissues. We commenced treatment within 3-5 minutes of

injection.

**Results**:

Three hundred and forty (340) patients that comprised of 150 males and 190 females, aged

between 21 years and 48 years were treated within the period of this study. The lesions

presented by the patients included: pericoronitis 114 (30%) which involved

impacted wisdom teeth. These patients received either a combination of tissue lavage with

antiseptics and normal saline and dressing ( conservative) and/or surgical

extractions (invasive) treatments; benign tumours including vasoformative growths 12 (12.11

%). Biopsies were performed; failed pulp and periapical abscess treatments 137 (36.05%). The

lesions among these patients included, broken down/carious crowns and pulp exposures, and

they received extractions. Periodontitis and submandibular abscess 32(10 %), and they received

periodontal curettage and / drainage; mandibular fractures due to fall from height 45 (11.84%).

This group of fracture patients sustained in addition, penetrating injuries to the soft tissues in

floor of the mouth. Reduction and fixations were done together with soft tissue repairs (table).

Limited mouth opening was a common finding among the Patients. However, trismus abated

following the administration of the CMT injections and patients were able to achieve adequate

mouth openings.

None of the patients experienced complication following the treatments up to 3 years post

operative.

**Discussion**:

Variation in the anatomy of the mandibular foramens and the canals sometime contribute to

failure of anaesthesia with the conventional injection method (inferior alveolar nerve block) in

patients with good mouth opening. This anatomical challenge makes it difficult for adequate

quantity of the solution to be deposited on adequate length of the nerve trunk. Adequate

quantity of anaesthetic is critical in achieving a profound anaesthesia because at least 6mm of

the nerve should be exposed to the anaesthetic solution for effective diffusion and anaesthesia

to take place5. The CMT is able to achieve profound local anaesthesia because the level of the

anaesthetic deposition is high on the nerve trunk so as to overcome the challenges of

anatomical variation. Moreover, the nerve tissue surface exposure to anaesthetic is large

enough for effective diffusion and anaesthesia. Also research has shown that injecting the

single branch, inferior alveolar nerve is not as effective in achieving profound anaesthesia as

when a plexus of nerves which include the other branches of the mandibular nerve are

injected8. The CMT injects the nerve plexus due to the level of deposition, and this leads to

profound anaesthesia. Supplemental supplies from ipsilateral nerves such as the cervical, and

the auriculotemporal are often anaesthetized with CMT. The Gow Gate method can also

perform a similar profound anaesthesia except that it is checkmated by the challenge of limited

mouth opening3,5,6,7.

Some of the patients had earlier sourced treatments elsewhere without successful treatments

until they were treated with CMT in our centres. The earlier failures could be attributed to

unusual innervations by nerve branches that did not usually contribute sensory innervations to

those fields, as well as inflammatory reactions in those target-tissues. For instance, in the

posterior dentitions, the mental nerve is not a usual contributor to the supply, and this is also

the case with the nerve to mylohyoid. There are reports of situations where these nerves

contributed to the supply of the posterior tissues2,3. Unknown to some practitioners, additional

infiltration of the tissue-targets in those fields would possibly solve the problem of failure.

However, the CMT and the Gow Gate methods are good techniques in solving the challenge

due to the level at which the solution is deposited.That level along the course of the mandibular

nerve trunk offers adequate and large area for diffusion of adequate anaesthetic solution to

effect conduction block in all the branches from that level of deposition down to the terminal

branches8.

Moreover, inflammation is associated with dilation of blood vessels which leads to increase in

blood supply to the area (hyperaemia) and this could cause anaesthetic ‘wash-out’, a condition

in which the anaesthetic solution does not concentrate enough at the required nerve-sites due

to increase blood flow2,3. These factors possibly explained the reasons for the failed

anaesthesia among the patients with acute local inflammatory conditions that experienced

failed local anaesthesia earlier. Inflammation is known to cause reduction in the pH of inflamed

tissues and this usually reduce the concentration of the lipophilic fractions from the anaesthetic

solution which diffuses through the nerve sheath8. This can reduce the effect of local

anesthetics on tissues. The deposition of the anaesthetic solutions at higher points on the

ramus of the mandible (area of nerve plexus) before the relevant branches were given off

apparently played a role in surmounting the challenges4,8.

Alcohol is known to alter the brain waves by adversely influencing the cell body metabolism9.

This results in slow rhythm and eventual suppression of impulse which lowers the level of

consciousness9,10,11.This could make local anaesthesia short-acting and shallow12, 13,14. This is

the reason why alcoholics or those who had taken alcoholic drinks within the last 24 hours

before their treatments were not included.

In conclusion, **t**he CMT of mandibular nerve block can be used to

anesthetise a variety of oro-dental lesions where mouth opening and failed local anaesthesia

with other methods of mandibular nerve blocks occur. Therefore, a regular resort to this

anesthetic protocol will save clinicians the stress encountered from the burden of repeated

recall-visits on patients on account of failed attempts or due to the fear of anesthetic failure

often encountered with the other mandibular nerve blocks, especially in conditions of

compromised mouth opening. The expected success in treating a wide variety of lesions will

improve job satisfactions among clinicians due to relative prompt and satisfactory solution to

patients’ problems. There is also the added benefit of reduced clinical stresss, economic and

social burden on patients. We therefore, encourage clinicians to give this technique a

consideration in their wider management of patients

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**Legend to table**:

Table shows number of patients and diagnosis of diseases for applying CMT.

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| --- | --- | --- |
|  NO of PTS ( % )  | Diagnosis and treatments | Reason for CMT |
|  114(30) | Pericorontis. Conservative and/or invasive | Trismus, inflammation, limited mouth opening |
|  12(12.11) | Tumours. Biopsies | Inadequate access due to trismus. |
|  137(36.05) | Pulp exposure and Periapical infection/abscess. Invasive | Trismus , ?supplemental innervations,  |
|  32(10) | Submandibular abscess and periodontitis inDiabetes mellitus. Invasive | Trismus, limited mouth opening |
|  45(11.84) | Trauma with mandibular: fractures, soft tissue lacerations. Invasive. | Trismus, limited mouth opening |
| TOATAL 340(100%) |

Table showing the number of patients (pts) and variety of lesions and reasons and treatments